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INDUSTRIAL HYGIENE.¹

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INDUSTRIAL hygiene has to do with the health of persons employed in various occupations. It is concerned with the work of each industry, with the way in which the work is done and with the conditions under which it is done in so far as the work, the way it is done and the conditions under which it is done, affect the health of those employed. It takes note of ill health whether trivial or more serious and endeavours to ascertain its cause. Ill health arises from factors the operations of which can be lessened and in some cases entirely prevented. No longer is ill health regarded as a visitation of Providence or a chastening to be borne meekly. When an epidemic is regarded as a plague sent by the Almighty as a punishment for national sin, few are found ready to act in the belief that it may be stayed by human ingenuity. The alleviation of ill health among occupied persons, to use a statistical name, is based on the recognition of the fact that ill health arises from agencies that can be

regulated by a proper understanding of the way in which they give rise to a failure of the normal physiological state of health. The practice of industrial hygiene is advocated in the belief that it lessens sickness among those engaged in different occupations. No longer is the fatalistic conception that sickness is inevitable, allowed to prevent the adoption of means calculated to diminish human suffering.

It has been noted in large industrial businesses employing many thousands of men that the number of days of absence from work per employee during a year lies around nine. This number has been found to be much reduced by the use of the simple precautions of preventive medicine and the services of a medical man well versed in the practice of the medical officer of health. Not infrequently the average number of days of absence from work during a year has been reduced to less than four per employee. When it is recollected that no hazard gives rise to more misery among occupied persons than sickness, the value of industrial hygiene in lessening sickness cannot be gainsaid. So far reaching are these effects of sickness among employed persons, that a powerful argument exists for the extension of the *Workmen's Compensation Act* of New South Wales, 1916, so that it embraces

¹Read at a meeting of the New South Wales Branch of the British Medical Association on April 30, 1925.

all illness arising among employed persons. Such an extension provides a sound scheme for dealing with one of the widespread evils of modern employment.

Measurement of Ill Health.

While the special risks of any occupation may be of importance, the need of a measure of the general health of those following different occupations has been felt by all those interested in industrial hygiene. It is necessary to compare the health of those of one industry with the health of those in another industry or with the health of all occupied persons.

It has been proposed to use mortality rates as a measure of the healthiness of occupations. Crude death rates have been compared in respect to the persons following different occupations and for "occupied males" and for "occupied females." These rates are rendered inaccurate by the facts that the occupation recorded in the certificate of death may not be that followed by the deceased person during the greater portion of life and that the number of persons in any industry may alter considerably by persons passing from one occupation to another. There is, however, a still more serious objection to the use of crude death rates, the effect of which may be measured. The death rates for persons of different ages are different and consequently the death rate for persons in any occupation is influenced by the ages of the persons following that occupation. When the ages of the groups are known it is possible to obtain a corrected death rate which may be used for comparison. The amount of correction necessitated shows how important becomes this factor of the ages of those in any occupation. Since the results of systematic medical examinations of those in industries have become available, it has been found how inadequate are the mortality rates even when corrected to express quantitatively the health of those in the various industries. When ill health leads to a fatal termination, mortality rates more nearly represent the health of occupied persons than when the ill health is not fatal.

Another measure of ill health that has been suggested, is the number of days of absence from work. Under some circumstances this figure does give some indication of the health of a group of persons. It is, however, subject to influences which discredit its use at all widely. It is found that the payment for services on the days of absence from work greatly affects the value of this figure. Thus it has been noted in many occupations that the number of days of absence from work *per annum* by each employee in many industries is roughly nine days per year, while among members of the civil service following similar occupations the figure rises to more than double. No one would contend that the health of these civil servants is so much worse than that of other occupied males. This figure does become of value in measuring the health of persons in the same occupation from time to time.

With the growth of knowledge of the health of employed persons it has become more and more apparent that morbidity rates alone provide an

accurate measure of the health of different groups of persons. This entails a measure of the health of the whole of the persons in an occupation. Examination of a selected group from those in any occupation, while not without some value in giving information about the health, is of little importance in respect to the general health of those in an occupation. Thus examination of two hundred and fifty printers from a group of three thousand following the occupation in the Commonwealth of Australia tells little about the general health of printers as compared with that of other "occupied males"; but such an examination has value in determining the presence or absence of a special risk, such as chronic poisoning by lead.

The determination of a special risk in any industry is much more easy than the determination of the general health. The absence of accurate information about the degree of prevalence of illnesses to which all persons are subject, became very apparent when these special examinations were made by those interested in industrial hygiene. The presence or absence of some disease associated with a particular risk of employment to which most persons are not exposed, for example pneumoconiosis due to dust or saturnism due to lead, is more readily ascertained. If it is desired to estimate the extent of this risk in persons in different industries or in different places in the same industry or at different times in the same industry, the determination requires much more care. It becomes necessary to examine the whole of the members of the industry.

The Technical Commission of Inquiry appointed by the Government of the State of New South Wales examined over four thousand persons at Broken Hill in 1920. This group represented about 60% of the whole group of persons employed at Broken Hill. It might be supposed that this group was roughly at any rate an average group of these employed persons. Compared with groups of two hundred persons which have been not infrequently used to determine the health of employed persons and with the 30% suggested by the New South Wales Board of Trade as likely to be representative of the workers at Broken Hill, it was a large proportion.

The persons suffering from pneumoconiosis were distributed as follows:

Among four hundred and sixty-one miners who had worked with drills for ten years and under at Broken Hill only, nine or 1.9% were affected with some degree of pneumoconiosis.

Among two hundred and ninety-six miners who had worked with drills for over ten years, but less than twenty years at Broken Hill only, twenty-three or 7.7% were affected with some degree of pneumoconiosis.

Among one hundred and forty miners who had worked with drills for over twenty years, but less than thirty years at Broken Hill only, twenty-four or 17.1% were affected with some degree of pneumoconiosis.

Among nineteen miners who had worked with drills for over thirty years at Broken Hill only,

seven or 36.8% were affected with some degree of pneumoconiosis.

Among two hundred and eighty miners who had worked with drills at Broken Hill and elsewhere for ten years and under, seven or 2.5% were affected with some degree of pneumoconiosis.

Among two hundred and forty-eight miners who had worked with drills at Broken Hill and elsewhere for over ten years, but less than twenty years, forty-two or 16.9% were affected with some degree of pneumoconiosis.

Among one hundred and forty-nine miners who had worked with drills at Broken Hill and elsewhere for over twenty years, but less than thirty years, forty or 26.8% were affected with some degree of pneumoconiosis.

Among one hundred and four miners who had worked with drills at Broken Hill and elsewhere for over thirty years, twenty-eight or 26.9% were affected with pneumoconiosis.

When it had completed its medical examinations at Broken Hill in December, 1921, the Technical Commission had completed its inquiry into the state of health of six thousand five hundred and thirty-eight mine workers employed in or about the mines at Broken Hill. These persons comprised all persons in the employment of the mining companies working at Broken Hill during the period of the work of the Technical Commission. The Technical Commission found the following results in respect to pneumoconiosis.

Among six hundred and eighty-nine miners who had worked with drills for ten years and under at Broken Hill only, seven or 1.0% were affected with some degree of pneumoconiosis.

Among five hundred and eighty-two miners who had worked with drills at Broken Hill only, for over ten years but less than twenty years, thirty-two or 5.5% were affected with some degree of pneumoconiosis.

Among two hundred and eighty-five miners who had worked with drills at Broken Hill only for over twenty years but less than thirty years, forty-four or 15.4% were affected with some degree of pneumoconiosis.

Among thirty-nine miners who had worked with drills at Broken Hill only for over thirty years, five or 12.8% were affected with some degree of pneumoconiosis.

Among three hundred and seven miners who had worked with drills at Broken Hill and elsewhere for ten years and under, eleven or 3.6% were affected with some degree of pneumoconiosis.

Among three hundred and twelve miners who had worked with drills at Broken Hill and elsewhere for over ten years but less than twenty years, forty-nine or 15.7% were affected with some degree of pneumoconiosis.

Among two hundred and forty-one miners who had worked with drills at Broken Hill and elsewhere for over twenty years but less than thirty years, sixty-four or 26.5% were affected with some degree of pneumoconiosis.

Among one hundred and sixty-three miners who had worked with drills at Broken Hill and elsewhere for over thirty years, forty-two or 25.8% were affected with some degree of pneumoconiosis.

These results obtained at the partial examination and the completed examination are set forth in Table I.

This table shows clearly how misleading were the percentage incidences of pneumoconiosis calculated from the results of the medical examinations of two-thirds of the persons employed at Broken Hill. This table also shows the necessity of comparing similar groups of persons. Thus the discovery that pneumoconiosis was confined as an industrial disease to miners at Broken Hill necessitated the elimination of surface employees from calculations of the incidence of the disease.

TABLE I.—MINERS AFFECTED WITH PNEUMOCONIOSIS.
FIRST SERIES (4,337 PERSONS).

Period of Employment.	Broken Hill Only.			Not Broken Hill Only.		
	Number Examined.	Number Affected.	Percentage.	Number Examined.	Number Affected.	Percentage.
10 years and under	461	6	1.9	280	7	2.5
20 years and over 10 years	296	23	7.7	248	42	16.9
30 years and over 20 years	140	24	17.1	149	40	26.8
Over 30 years	19	7	36.8	104	28	26.9

SECOND SERIES (6,538 PERSONS).

Period of Employment.	Broken Hill Only.			Not Broken Hill Only.		
	Number Examined.	Number Affected.	Percentage.	Number Examined.	Number Affected.	Percentage.
10 years and under	689	7	1.0	307	11	3.6
20 years and over 10 years	582	32	5.5	312	49	15.7
30 years and over 20 years	285	44	15.4	241	64	26.5
Over 30 years	39	5	12.8	163	42	25.8

Personal Examination of Occupied Persons.

The examination of occupied persons includes an account of their condition, a summary of the industrial work that they have carried out, an account of their health and the report of the medical examination. These results may be recorded in many ways, but it is advantageous to record the results on a printed form when many persons are examined. This printed form should be prepared with care so as to cover the ground of the personal examination. Its use insures that the information needed is available on the records. It is valuable to frame questions and to note observations in such a way as to obtain positive or negative answers. This method greatly assists the later examination of the results recorded on the cards. The recorder must decide with the examinee present what is to be recorded either *plus* or *minus*. The examination records the age of the worker, date of examination, married state and so forth. The industrial history states what period the worker followed each occupation after leaving school until the time of the examination. The family history and past medical history are mentioned. It is important to ask when the services of a doctor have been required and when the person attended hospital. An account of the health of the person in his own words is followed by answers to questions about symptoms denoting ill health. Height, weight, pulse and respiration rates, temperature and blood pressure are noted. The protocols of the results of the medical examination of the different systems of the body follow. Finally any diagnoses or conclusions are made.

The results of these examinations can be recorded on other cards. In this tabulation every handling of a card occupies time and the repeated handling of several hundred cards is tedious. Much time is saved by transferring the results of the cards on to sheets of brief or other paper sufficiently large to take the whole of the results. These are recorded in vertical columns, the horizontal rows giving the results for each individual. From these sheets the individual results can be selected with much greater ease. Tables for statistical purposes can be prepared with a great saving of time. Such a method involves a single handling of each card rather than multiple handlings.

The inferences from the results of medical examinations should be made at the time when the patient is present and when it is possible to make such special examinations, blood tests, urinary tests, bacteriological tests and radiographic examinations as may be required.

Industrial Examinations.

In addition to the medical examinations of the occupied person it is important to examine the conditions under which the work in the industry is done. This examination will vary with each separate industry. The determination of the conditions in the industry demands the introduction of many new methods of investigation. Every effort should be made to obtain quantitative measurements of the factors taken into account.

As an example the effect of the height of the work bench on the output of work may be noted. Many attempts have been made to determine whether the way in which the work is done and the conditions under which it is done can be improved from the standpoint of hygiene. The selection of a suitable method of measuring the work is by no means easy. There has been an attempt to use the efficiency of the body for this purpose. When the body is doing work a certain proportion of the energy of the food is converted into work. What this proportion may be depends on the conditions under which the work is done. Thus a miner working in the stopes at Broken Hill converts a different proportion of his fuel energy into external work according to the temperature of the stope in which he is working. The weight of ore put out by a miner during each shift forms a good measure of the suitability of the conditions of work.

The use of this method is making progress in the investigation of the conditions applying to different occupations. It is sometimes necessary to determine the intake of energy, but it is usually not necessary to do so. The measurement of the efficiency of the individual in performing the actual task of his occupation is recognized to be of more value than records of the work done under similar circumstances by a man on a bicycle ergometer or similar machine.

Fatigue and Undue Fatigue.

All those interested in industrial hygiene have met with the question of fatigue and of undue fatigue.

What changes constitute fatigue and what changes constitute undue fatigue? The physiologist regards as fatigue those changes brought about by muscular work which disappear after the cessation of work; as undue fatigue those changes which are more or less enduring as a result of work. Undue fatigue leads to changes in the functions of the body which can be definitely recognized by the medical examiner.

There is, however, a belief among some interested in industrial hygiene that undue fatigue may exist apart from any enduring alterations in the functions of the body. They regard fatigue as excessive before it causes any change in the health of the occupied person. Fatigue becomes undue fatigue whenever it is excessive. What constitutes an excess then becomes a matter of opinion. A medical hygienist discussing the fatigue of factory girls called it undue because he observed the girls sweating. Surely sweating is considered by physiologists as a sign of work and not of excessive work. Further there is no evidence that sweating is bad for the health and to be avoided. Rather the physicians and the physiologists agree with the sage who wrote that "in the sweat of thy brow, shalt thou eat thy bread."

Medical evidence of changes in the weight of the body, of alterations in the composition of the blood, of changes in reaction times, of diminished efficiency of working capacity of the body (percentage of fuel energy converted), are signs of

undue fatigue. The number of days of absence from work may also afford evidence of the onset of undue fatigue.

The Practice of Industrial Hygiene.

It has been sometimes stated that employed persons will not submit to the examinations necessary for supplying the data on which the practice of industrial hygiene is based. While no doubt objections have arisen both from employers and employees, these objections are taken less frequently than is usually supposed. The employer welcomes the increased output which arises from work under conditions conducing to greater efficiency in the output of the body. The employee is only too ready to cooperate in measures which lessen the days spent in sickness. These two arguments represent the keystones of appeals for the introduction of more practice in industrial hygiene.

Attention may be directed in conclusion to the training of the practitioner of industrial hygiene. Undoubtedly he should be a medical practitioner. No other person possesses the requisite knowledge for the medical aspect of industrial hygiene. Further no other person so easily gains the confidence of the occupied person. The training of the medical practitioner is, however, not that required for the industrial hygienist. Many of the problems which must be dealt with, are outside the scope of the medical curriculum. There is need of a special course of training on lines somewhat similar to that required for the diploma of public health.

The question finally arises whether the medical man practising industrial hygiene should engage also in general medical practice or should devote himself entirely to industrial hygiene. While there is room for differences of opinion, it would appear more advantageous if the practice of industrial hygiene was that of a whole-time medical officer dealing with a particular business or group of businesses. The industrial hygienist should remember that he is essentially a medical practitioner and that his attitude to all questions should be based on the principles of medicine. He should carefully avoid confusing economical questions with those of hygiene. While welfare work in many points touches industrial hygiene, hygiene is a very definite branch of medicine concerned with certain questions of medicine.

SOME ASPECTS OF LEAD ABSORPTION.¹

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THERE is no subject of such burning interest in industrial medicine as that of lead poisoning and the effects of lead on the health of persons exposed to it in their employment.

In modern industry lead is used in a surprisingly large number of processes and manufactures. Layet mentions one hundred and eleven industries in which lead is employed and Alice Hamilton states that there is no industry in which lead is not used at some time. Since the absorption of the metal in sufficient quantities causes disease, efforts are being made more and more as time goes on to prohibit the use of lead or to ameliorate the conditions of those whose work exposes them to it, either by regulation of the industries involved or by the shortening of the hours of work.

In presenting evidence upon which such efforts are based a wide diversity of medical opinion has revealed itself. It is proposed here to discuss some aspects of the effect on health of the continuous absorption of small quantities of lead. In considering this problem, there are certain fundamental facts which have to be kept continually in mind.

It is now clear that the main and indeed the only considerable cause of lead poisoning in industry is dust containing lead in suspension. The statement: "Get rid of dust and lead poisoning disappears" has now won universal recognition among industrial hygienists. It is to be deplored that it has not won such recognition from all employers of labour in this country. Some difference of opinion exists as to the main channels of entry by which lead inhaled as dust finds its way into the tissues, whether by the lungs or by the digestive tract, but the weight of evidence points very definitely to the lungs. Lead poisoning, therefore, in its industrial aspect must be regarded as an inhalation disease. Although ingestion of lead in a form other than atmospheric dust may occur, it is of comparatively small practical account and, although cleanliness still holds its traditional high rank among the virtues, it is of no avail in the prevention of lead absorption if the atmosphere is charged with fine particles of lead. Every person who works in an atmosphere containing lead, is exposed to this absorption.

It is very necessary at the outset that the clear distinction between lead absorption and lead poisoning should be borne in mind. The term "lead absorption" means the absorption of lead and has simply a biochemical meaning. It does not carry necessarily a pathological implication, as many writers assert, since it merely connotes the fact that lead is taken into the body and absorbed by the tissues. If it should be shown that health has depreciated to any degree as a result of such absorption, then lead poisoning has occurred, but this pathological sequel does not necessarily follow the chemical fact of absorption. The contrary has often been stated quite erroneously. It is a general law of pharmacology that every drug has a threshold value and we possess no evidence that lead is an exception to this rule. Yet the assertion is frequently made that lead absorbed in any quantity, no matter how minute, must ultimately cause disease. Such statements as these, in which no attention is paid to the amount or dose

¹ Read at a meeting of the New South Wales Branch of the British Medical Association on April 30, 1925.

absorbed day by day, have gained quite a wide acceptance.

The absorption of a sufficient dose by a susceptible person produces symptoms and signs which give a classical picture of lead poisoning, presenting no difficulty of recognition. Such a picture may reveal the characteristic lead pallor, colic of a very well defined type or the presence of a lower neurone paralysis, usually extensor in type. The Broken Hill investigation revealed that in a large industrial group, about 3% of the men employed in the mines, were susceptible persons.

But what is the effect of absorption of smaller doses of lead over a long period, doses insufficient to cause outspoken and easily recognizable plumbism? It is the belief of some that the absorption of small doses over long periods causes a general depreciation of health which does not show itself by the presence of anemia, colic, paralysis or encephalopathies, but by a loss of weight, loss of capacity for work, minor nervous disturbances, a diminished resistance to infectious disease, especially to pulmonary tuberculosis, and by the presence of degenerative conditions in the arteries, heart and kidneys. The evidence on which this opinion is founded is insufficient and unconvincing.

Duckering studied the incidence of lead poisoning in relation to the amount of lead contained in the dust of workrooms and concluded that two milligrammes of lead is the lowest daily dose which, absorbed by inhalation over a long period, could ultimately cause poisoning. Teleky also investigated this problem and was of the opinion that a little more than one milligramme of lead absorbed daily over a long period could in susceptible persons cause poisoning. The evidence obtained by the Technical Commission of Inquiry at Broken Hill led to the conclusion that men exposed to the inhalation of lead in such a way that they would absorb between one and two milligrammes of the metal *per diem* for a long period of years, would only suffer from lead poisoning in a comparatively small number of instances. The incidence of lead poisoning under such circumstances is indicated by the following facts.

One thousand four hundred and ten men had worked underground in Broken Hill as practical miners. Consideration of the chemical analysis of the air in the mines, taken under actual working conditions during the different operations which a miner carries on in his daily work, enabled an estimate to be made with some degree of accuracy of the total amount of lead suspended in the mine air during the full day's work. This estimate yielded a figure lying between one and two milligrammes of lead as a daily dose likely to be absorbed. Of the six hundred and sixty miners who had worked only underground at Broken Hill exposed to such conditions for ten years and under, one or 0.15% was suffering from poisoning by lead. Of the four hundred and twelve miners who had worked only underground at Broken Hill for over ten years and under twenty years, eleven or 2.6% were affected.

Of the two hundred and seventy-one miners who had worked only underground at Broken Hill for over twenty years and under thirty years, ten or 3.7% were affected. Of the sixty-seven miners who had worked only underground at Broken Hill for over thirty years, three or 4.5% suffered from lead poisoning.

SIGNS OF LEAD ABSORPTION.

The proofs of lead absorption necessarily are in the main chemical. The signs indicative of this phenomenon are: (i.) The blue line, (ii.) lead in urine, (iii.) lead in faeces and (iv.) basophilic stippling of the red blood cells.

The Blue Line.

The presence of the blue line in the gums is indicative of nothing more than lead absorption. It is not a sign of lead intoxication. It should be noted in passing that the recognition of the true blue line needs such care in examination as cleaning the gums and identification by means of a hand lens of the granular character of the deposit. Dependent as it undoubtedly is to a large extent on a healthy condition of the teeth and gums, it is an inconstant sign and gives no indication of the true incidence of lead absorption when applied to a group of men. At Broken Hill the blue line was found infrequently.

Lead in Urine.

The detection of lead in the urine is the surest means of recognizing the presence of lead absorption. Older authorities have asserted that lead is only occasionally found in the urine of persons absorbing lead. These statements are the outcome of investigation by methods of chemical analysis which revealed one part of lead in 40,000 parts of organic material. Newer methods of analysis, however, have made it possible to identify one part of lead in one million or even five million parts of organic material. It is obvious that lead in urine must be lead which has been absorbed by the tissues and excreted through the kidneys. At Broken Hill the urine of all men working in or about the mines contained lead.

Lead in Faeces.

It is clear that the presence of lead in faeces is not a reliable indication of lead absorption. Although lead is undoubtedly eliminated from the tissues through the bowel, there is no means of determining how much of the lead in faeces is lead which has been circulating in the blood stream and excreted through the bowel, and how much is lead which has passed through the gastro-intestinal tract unabsorbed.

Basophilic Stippling of the Red Cells.

Since Behrend in 1899 pointed out the association of the stippling of the red blood cells with lead poisoning, a considerable literature has arisen as to the significance and nature of this change in the blood corpuscles. Although there still remains doubt as to the real nature of the change,

it is clear that it is not a specific phenomenon, because it occurs in such diseases as pernicious anæmia, malaria, the anæmia caused by new growths and tuberculosis and in pneumonia in infants. The weight of clinical evidence indicates that it must be regarded, not as a sign of intoxication, but as merely an indication of absorption of lead. Stippling of the red cells occurs early after exposure to the absorption of lead, but it does not bear any constant or definite relation to the occurrence of intoxication. It does not always coexist with the presence of lead in the general blood stream. At Broken Hill it was very infrequently found, although lead was detected in the urine of all men working in or about the mines. There is some evidence which indicates that it is caused by a purely chemical effect on the surface of the corpuscle, and that it does not interfere with the physiological functions of the cell. Stippling of the red cells is, therefore, to be regarded at present as evidence of lead absorption. In that it is not specific and relatively inconstant, it is not as valuable as a sign of absorption as the presence of lead in urine.

The detection of lead in the urine of all men who worked in or about the mines at Broken Hill, established the fact that all were absorbing lead daily in their employment. Among 6,538 men who were absorbing lead daily, sixty-one only were found to be suffering from lead poisoning. Two thousand four hundred and ninety-one or 38.1% of those examined, gave no history of any colic, weakness or past ill health of any description whatever and presented no evidence of any kind of departure from normal health, although they had been exposed to the action of lead during the whole period of their employment at Broken Hill.

The fact that many of these men had worked for long periods under conditions which exposed them to the daily absorption of lead in minute quantities, is sufficient to disprove the claim that lead in minute quantities must inevitably produce tissue damage.

ARTERIOSCLEROSIS AND NEPHRITIS.

The further question arises, however, as to the general level of health of men who have been absorbing lead over a long period of years, but who have not shown the symptoms and signs of a definite lead poisoning. This is a difficult question to answer. There exist no standards which can be used for purposes of comparison. No similar large group in any industry has been completely subjected to a clinical examination. No knowledge exists as to the weight and height standards and the incidence of arteriosclerosis and renal disease, for example, in a single industrial class in this country. Yet it is possible to arrive at an opinion on some points of importance. This communication proposes to deal with the evidence on one point only, namely the occurrence of arteriosclerosis and nephritis.

It has frequently been asserted that generalized arteriosclerosis and nephritis of arteriosclerotic

origin arise in many persons as the result of such exposure. This assertion has been founded on insufficient evidence. Although statistics show an increased mortality from arteriosclerosis and nephritis among men who have been exposed to a definite lead hazard in their occupation, they do not show the effect of the size of the dose. Morbidity statistics of a satisfactory nature do not exist. There is no experimental evidence to show that exposure to doses of lead insufficient to cause classical signs of lead poisoning will cause tissue damage to the arteries and kidneys.

In the Broken Hill investigation 6,538 men were examined, who had been exposed to the absorption of lead for periods ranging up to over thirty years. Of these, 1,410 men had only worked underground as practical miners. They had been exposed to the absorption of a daily dose of between one and two milligrammes. One thousand, five hundred and ninety-seven had worked only upon the surface. These men who had worked only on the surface, had been exposed to a much smaller daily dose, except in exceptional instances where the particular nature of their employment involved more or less occasional exposure to a higher dose. The proof that surface workers were subjected to a much lower exposure lies, not only in the results of the air sampling, but may be recognized in two other ways: (i.) The dust which the underground miner inhales, contains silica and other hard metalliferous substances as well as lead. Practically none but underground miners were found to be suffering from pneumoconiosis, showing that their exposure to dust was more intense than other mine workers. (ii.) Cases of undoubted plumbism occurred to a very much greater degree among men who had worked underground only, than those who had worked only on the surface. For example, among 1,410 practical miners (underground workers), twenty-five were found to be suffering from lead poisoning, while of 774 mill hands (surface workers), one only was affected with plumbism. A large number of men had worked for varying periods both underground and on the surface, but in view of the fact that no accurate knowledge is available as to the degree of exposure of this group, they will be left out of consideration. One has to contrast, therefore, the incidence of arteriosclerosis and nephritis among men exposed to the inhalation of a daily dose of between one and two milligrammes, with the incidence in a group who although absorbing lead, have been exposed to a much smaller dose.

There are also available for the purpose of comparison figures showing the incidence of arteriosclerosis and nephritis among seven hundred and sixteen quarrymen, stonemasons and rockchoppers, many of whom had worked over long periods in an industry in which they were not exposed to the absorption of lead.

The following tables show the incidence of arteriosclerosis and nephritis among seven hundred and sixteen sandstone miners, one thousand, four hundred and ten underground workers at Broken Hill and one thousand, five hundred and ninety-

seven surface workers at Broken Hill. The first group had not been exposed to the action of lead at all; the second group had been exposed to the action of the absorption of a dose between one and two milligrammes per day and the third group had been exposed to the absorption of a much smaller daily dose of lead.

TABLE I.—PERCENTAGES OF MEN EXAMINED, ARRANGED IN AGE GROUPS.

Ages.	Under 40 Years.	41 Years to 60 Years.	Over 60 Years.
Sandstone	5.3%	8.8%	16.9%
Broken Hill, Under-ground Only	2.4%	12.9%	29.1%
Broken Hill, Surface Only	3.0%	7.6%	17.8%

Incidence of arteriosclerosis and nephritis among 716 sandstone workers in Sydney, 1,410 underground workers at Broken Hill and 1,597 surface workers at Broken Hill.

It will be observed that there is an appreciably greater incidence of these diseases among the underground workers. Since the nature of their employment only differs in so far as its known effects upon health are concerned from that of the surface workers in the greater exposure to the dust of the mines, it may be taken that these figures express the effect of lead in the production of arteriosclerosis and renal disease. After a scrutiny of the symptoms and signs presented by each man in the Broken Hill groups, it was apparent that a number of them presented in addition to evidence of arteriosclerosis and renal disease other evidence of past or present definite lead poisoning, such as a history of colic or the presence of *extensor paresis*. Subtracting these individuals from the totals, a second table was constructed.

TABLE II.—PERCENTAGE OF MEN EXAMINED, ARRANGED IN AGE GROUPS.

Ages.	Under 40 Years.	41 Years to 60 Years.	Over 60 Years.
Sandstone	5.3%	8.8%	16.9%
Broken Hill, Under-ground Only	2.4%	8.0%	16.6%
Broken Hill, Surface Only	3.0%	7.6%	15.5%

Incidence of arteriosclerosis and nephritis among 716 sandstone workers in Sydney and among workers at Broken Hill who presented no other evidence of lead poisoning, namely: 1,397 underground workers and 1,594 surface workers.

This expresses the incidence of arterial and renal disease in those persons who gave no other evidence of lead poisoning. It is apparent, then, that there is no significant increase in the incidence of these diseases indicated in the table so prepared. This evidence is valuable and points to the fact that the absorption of small doses of lead does not produce arteriosclerosis or renal disease without at the same time producing other manifestations of lead poisoning. Such evidence as is obtainable,

therefore, from the Broken Hill investigations proves that the absorption of a small daily dose of lead over a long period of years does not produce necessarily any disease or tissue damage to arteries or kidneys.

X DISEASE IN TOWNSVILLE.

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AND

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DURING April and May in Townsville attention was attracted to the occurrence of cases of a disease characterized by a fairly sudden onset, severe course with cerebral symptoms and heavy mortality. During these two months at least eleven cases were recognized; ten of the patients died. In addition to these eleven cases there was a doubtful one in an adult who recovered, but was left mentally sluggish. All eleven patients were children and all but one males. They ranged in age from two to seven years. One recovered and his condition is reported to be physically normal, but mentally dull.

Of the six patients who were seen at the Townsville General Hospital, two were brothers from the same house and two more uncle and nephew, aged seven and three years, not living in the same house, but meeting one another fairly frequently.

A typical history is as follows. The first symptom complained of is headache. This is followed soon by vomiting. Convulsions usually appear in about thirty-six hours, the temperature at this stage being usually about 37.8° to 38.3° C. (100° to 101° F.). The pulse is correspondingly rapid; respirations are not unduly increased; constipation was noted in all cases. The reflexes are normal; the eyes react to light. The child lies on its back with the eyes open and at first will answer simple questions and perform simple acts, but resists handling or manipulations by stiffening the whole body. The temperature rises fairly quickly (in one case it reached 42.4° C. or 108.4° F.) and coma comes on; the faeces and urine are passed into the bed and death usually occurs in two to five days from the onset. In some cases pronounced neck rigidity and episthotonos during convulsions were noted. In one case hemiplegia occurred. The cerebro-spinal fluid is clear and under increased pressure.

Pathology.

The morbid anatomy of X disease in Australia, closely similar to that of acute poliomyelitis except that there is much greater involvement of the brain, has been fully described by Breinl⁽¹⁾ and others.

The usual picture was present in these cases.

Pathological examinations of some kind were carried out in four cases.

(1) Male, aged three years; the cerebro-spinal fluid was examined before death and was found to contain ninety cells per cubic millimetre, mainly mononuclear leucocytes;

the globulin was not increased. Parts of the brain were obtained. The leptomeninges were injected and slightly clouded and the brain substance soft.

Microscopically the changes were striking; they were as pronounced in the cerebral cortex as in the basal ganglia and as prominent in the subcortical white matter as in the grey matter. All vessels were engorged. Especially in those above capillary size a prominent collar of round cells was to be seen, outside which, especially in the subcortical white matter, was frequently a zone of sponge-like rarefaction. Collections of small round cells not in evident relation to any vessel were also numerous. In the grey matter of the cortex infiltrations were less prominent and capillary engorgement was the most evident feature. Some hemorrhages into the perivascular spaces were seen, but none elsewhere. There was evidence of stasis in some of the small venules.

(2) Male, aged six years; a *post mortem* examination was made. The spleen was not enlarged and appeared quite normal nor were any changes noticed in the mesenteric glands. In the kidneys there was plum coloured cortical congestion. The brain was slightly softer than normal. In the pia-arachnoid universal injection was seen and its ground tint was pinkish. The spinal cord was not examined.

Microscopically engorgement of the pia-arachnoid was seen as well as increased cellular and fluid content and diffuse extravasations of red cells. A thin stratum of small round cells in its deepest layer was present in some places. The changes in the brain tissue were similar to those in the first case, but rather less prominent. The grey matter of this cortex had more evident changes than the white.

(3) Only the cerebro-spinal fluid was examined, obtained by lumbar puncture before death. There were thirty-six cells per cubic millimetre, all mononuclear leucocytes; the globulin was very slightly increased. The fluid did not yield a Wassermann reaction.

(4) The necropsy was seen and the brain and cord obtained. The membranes of the cord looked oedematous. In those of the brain there was congestion of the vessels, but no hemorrhages. The brain substance was soft and oedematous. On section numerous engorged vessels were apparent, both in the white and the grey matter.

Microscopically in both cord and brain changes similar to those already described were detected. Certain of the nerve cells were swollen, with poorly staining nuclei. Round cell infiltration was present round the central canal of the cord.

The temperature chart of one case and a drawing of a lesion in the subcortical white matter are reproduced (see Figures I. and II.).

The name X disease used in this paper has been frequently applied to the Australian form of acute encephalitis. The term is used in a memorandum which was submitted by Professor Cleland and adopted by the Section of Pathology and Bacterio-

logy of the Australasian Medical Congress (British Medical Association) in November, 1923.⁽²⁾ In this memorandum the question of the relation of this disease to classical acute poliomyelitis on the one hand and to *encephalitis lethargica* on the other is discussed and the conclusion expressed that it is not *encephalitis lethargica*, but is either a distinct entity or the encephalitic form of ordinary acute poliomyelitis. Professor Cleland favours the former view.

The history of X disease and its chief features may be briefly recalled. It was first recognized about March, 1917, before *encephalitis lethargica* had been heard of, although it was in this year that the disease was first recognized by Economo in Austria. Cases of *encephalitis lethargica* of the form prevailing in Europe and America first appeared in Australia about the middle of 1919. Epidemiologically there has been no clear relation between outbreaks of infantile paralysis and of X disease, nor of outbreaks of either and of *encephalitis lethargica*.

X disease is defined mainly and fairly sharply by its epidemiological and clinical features. Apart from the present cases at least two definite epidemics have occurred, one in March, April and May, 1917, in parts of New South Wales and Queensland, and one early in 1922 mainly in southern Queensland (Brisbane and Ipswich). The seasonal prevalence, at the end of summer and beginning of the cooler

weather, is again seen in the present outbreak; it is very like that of infantile paralysis. All ages are attacked, but its local incidence is often mainly on children. The remarkable preponderance of males seen in this epidemic has not always occurred, but has been observed in a striking degree in other local outbreaks, for instance the Broken Hill cases of 1917.^{(3) (4)} The disease is acute with characteristic cerebral symptoms and the mortality very high. Geographically the disease presents features of interest in its localization hitherto to certain parts of Australia. Townsville was attacked in the first epidemic of 1917.

As regards the relation of the cases here reported to the occurrence of infantile paralysis, the facts as known to the writers may be mentioned. The severe epidemic of infantile paralysis which began a year ago in New Zealand, has now died down

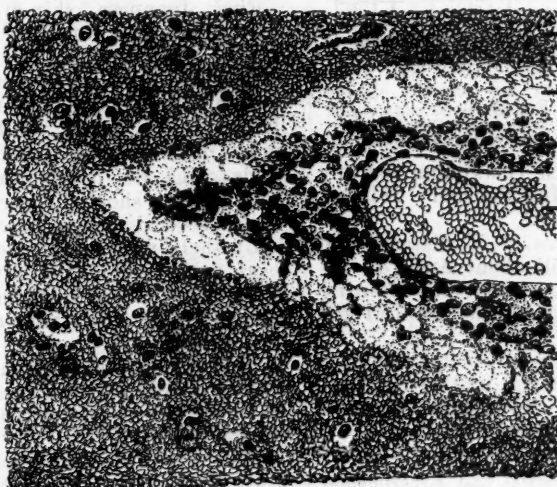


FIGURE I.

Sketch of a typical lesion in the subcortical white matter.

1. Normal tissue.
2. Area of rarefaction.
3. Area of round celled infiltration including extravasated red blood cells.
4. Engorged venule.

there without yet appearing in Australia. The figures for infectious diseases in the different Australian States published by the Commonwealth Department of Health for four-week periods, have shown up to April 18 no unusual prevalence of acute poliomyelitis. The figures supplied by the State of Queensland show a few cases through

January, February and March (maximum for any week seven for the week ending February 21) and scarcely any in April and May.¹

In the earliest of the cases of X disease here reported the patient became ill about April 4. As regards Townsville itself no patients with infantile paralysis have been admitted to the hospital for more than a year.

Our thanks are due to Dr. Breinl for his kindness in supplying pathological material and to Dr. Taylor, Superintendent of the Townsville General Hospital, for the clinical histories.

References.

⁽¹⁾ A. Breinl: "Clinical, Pathological and Experimental Observation on the 'Mysterious Disease,' a Clinically Aberrant Form of Acute Poliomyelitis," *THE MEDICAL JOURNAL OF AUSTRALIA*, March 16 and 23, 1918, pages 209 and 229.

⁽²⁾ *THE MEDICAL JOURNAL OF AUSTRALIA*, December 8, 1923, Report of the Proceedings of Congress, pages 594 and 614.

⁽³⁾ G. H. Burnell: "The Broken Hill Epidemic," *THE MEDICAL JOURNAL OF AUSTRALIA*, August 25, 1917, page 157.

⁽⁴⁾ G. H. Burnell: "The Broken Hill Epidemic," *THE MEDICAL JOURNAL OF AUSTRALIA*, April 6, 1918, page 278.

SOME NOTES ON A SERIES OF CASES OF BLACKWATER FEVER IN THE TERRITORY OF NEW GUINEA.

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THE following notes on three cases of blackwater fever and the circumstances surrounding their occurrence appear to be interesting on account of the very special conditions which led to the ultimate result.

¹ Since the date of writing the epidemic has died out. Only one other patient was sent to the Townsville Hospital on June 1, 1925.

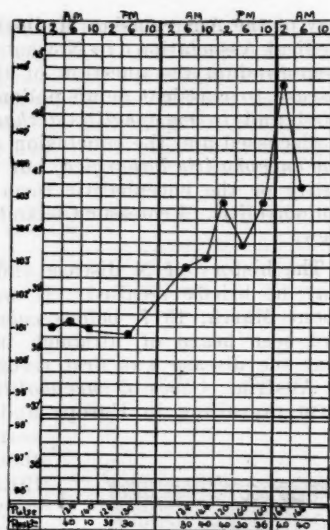


FIGURE II.
Typical Temperature Chart.
From the Second Day to Death.

Here were practically all the conditions usually quoted as predisposing to blackwater fever. In none of the cases, however, was there any history of a precipitating dose of quinine.

It is not intended to discuss here the several theories of the causation of blackwater fever, but the evidence provided by the cases under review rules out the quinine theory (now practically discarded in any case) and appears to point more strongly to a malarial than a specific cause, despite the absence of malaria parasites in the blood of the three cases dealt with.

During the year 1924 a small steamer was wrecked off the coast of Tabar, a little island situated about 2° 50' south latitude and 152° east longitude, mountainous in the interior and with swampy coastal lowlands. Its annual rainfall is heavy and there is a frequent cool or cold evening breeze.

Five Japanese skin-divers were engaged in salvage work on the wreck during the months of August, September, October, November and December, 1924, under conditions ideal for the epidemics of malaria fever. (i.) They were living in a small building situated in the midst of anopheline breeding places on the lowlands; (ii.) the jungle was only partially cleared for quite a short distance round their residence, while several large trees were left standing, (iii.) their native labourers and a portion of the local native population lived near by; (iv.) they carried out their arduous duties while exposed alternately to chilly rain and burning sun, during the evening they were inadequately protected against what was to them as old residents in the tropics a cold evening breeze; (v.) the latter half of their stay on the island was during the rainy season.

Thus were provided a non-immune population of lowered resistance through constant exposure and fatigue; anopheline mosquitoes and adequate shelter for them in proximity to the residence of the non-immunes; a native population, many of whom habitually carry in their peripheral blood the sexual forms of the malaria parasite.

With such conditions and in the absence of quinine prophylaxis frequent malarial attacks were to be expected and actually each of the Japanese suffered frequently. In this regard it might be noted that the Japanese in this territory have a particular aversion for taking quinine while the fever is high, as they have the impression that at such times quinine is very apt to precipitate an attack of blackwater fever. The consequence is that when the fever subsides spontaneously, quinine is taken probably in inadequate doses and eventually forgotten or neglected altogether. This procedure is not without its irony when the subsequent results of the Tabar cases are considered.

After being subjected to numerous recurring attacks of malaria, one of the five contracted blackwater fever during the month of December and died. The efforts at salvage of the wreck had failed and the remainder of the divers then returned to Rabaul, arriving about the middle of December.

Two of them drank alcohol to excess during the Christmas and New Year festivities, took no prophylactic quinine and developed blackwater fever on January 4 and 5 respectively, one case proving fatal after an illness of three days.

One other drank to excess over Christmas and New Year, but took small doses of quinine at irregular intervals. He was stricken with blackwater fever on January 6, but suffered a much milder attack than the two who had taken no quinine.

The fourth was abstemious, took 1.2 grammes (twenty grains) of quinine daily and remained in health.

To recapitulate the sequence of events may be quoted thus:

1. The stage is set on the Island of Tabar for the enactment of the malaria drama;
2. The principals are subjected to frequent malarial attacks over a period of roughly four months, during which time one of them dies of blackwater fever;
3. The remaining four return to Rabaul, anæmic and mentally and physically depressed;
4. They fail (save one) to pay sufficient attention to personal hygiene, scorning quinine prophylaxis and drinking to excess;
5. They all develop blackwater fever save the one who was abstemious and took quinine regularly.

CASE REPORTS.

Case I.

The following are brief notes of the cases.

S.E., *ætatis* thirty-three years, was admitted to hospital on January 4 complaining of passing dark urine. He had lived in this territory for eleven years, during which period he had had no serious illness beyond occasional and during the few months prior to admission frequent attacks of malaria. He had drunk alcohol to excess during Christmas and New Year 1924-1925 and had taken no quinine prophylactically. Had two shivering attacks on January 3, followed by fever the same evening.

On the morning of admission to hospital he noticed that his urine was almost black in colour and complained of severe pains in the loins, some pain in the upper portion of the abdomen and great weakness.

On admission the temperature was 39.4° C. (103° F.), the pulse was rapid and weak and the respirations were shallow.

The patient lay supine and was listless. The features were drawn, the lower lip drooping; the gums were pallid. There was evident generalized icterus. The splenic margin was palpable five centimetres (two inches) below the costal border. The liver border was not palpable. There was some tenderness in epigastrium and left hypochondriac region. The urine was of a deep port wine colour and separated into two layers on standing. There was a heavy cloud of albumin and microscopical examination revealed the usual casts.

There was evidence in the blood of a distinct secondary anæmia. No malaria parasites were seen.

Treatment.

Sternberg's mixture (nine grammes or one hundred and fifty grains of sodium bicarbonate with 0.02 gramme or one third of a grain of mercury perchloride in 1.136 litre or one quart of water) was given in forty-five mil (one and a half ounce) doses every hour. Calcium lactate in 0.3 gramme (five grain) doses was given every four hours. Fluids were given in abundance. Hot packs were applied to the loins and treatment otherwise given on general lines.

Progress.

The patient had no more rigors and the general condition commenced to improve almost immediately.

Highest temperature reached was 40.3° C. (104.6° F.) rapidly remitted to normal, but daily reached 36.6° C. to 37.4° C. (99° F. to 99.4° F.) until date of discharge.

Convalescence was slow and the icterus was long in disappearing. The patient was discharged convalescent, though still unable to walk on January 1, 1925.

Case II.

I.S., *ætatis* thirty-three years, was first seen on the evening of January 5 and was attended in his own home.

He complained of blackwater fever. He had lived for eight and a half years in the territory, during which he had suffered from malaria—persistently during the previous few months. He gave no history of other serious illness. He admitted alcoholic excess during the Christmas and New Year holidays. He had taken no quinine prophylactically.

Fever had commenced on January 5, during the afternoon of which day he had noticed his urine was very dark in colour.

He complained of severe pain in the loins and some pain in the lower abdomen and felt very weak and ill.

The temperature was 40° C. (104° F.), the pulse was rapid and weak. There was definite jaundice and the splenic margin was palpable about one hand's breadth below the costal border.

The urine was almost black in colour and had the appearances characteristic of blackwater fever. In the blood there was evidence of secondary anæmia, but no malaria parasites were seen.

Treatment.

The same treatment was employed as for S.E. In addition saline solution was administered subcutaneously on two occasions (the patient struggled so much during and became so collapsed after the operation that it is doubtful whether he derived any benefit). Morphine 0.0075 gramme (one-eighth of a grain) was given once hypodermically for restlessness.

Progress.

The urine became somewhat paler. At no stage was there any suppression of urine. Patient became gradually weaker; his temperature remained in region of 40° C. and delirium became a prominent feature. The respiration became of sighing type and the patient died in coma on January 8, 1925.

Case III.

I.T., *ætatis* thirty years, was first seen on January 6, when he complained of blackwater fever. He was attended in his own home.

The patient had lived for seven years in the territory of New Guinea. He had had frequent attacks of malaria, especially during the previous few months, but had had no other serious illness.

He had drunk alcohol to excess during the Christmas and New Year festivities. He had taken a little quinine at irregular intervals during the previous few weeks.

Fever had commenced on the evening of January 5 and on the morning of January 6 he had noticed that his urine was very dark in colour. He complained of severe pains in the loins.

His temperature was 39.4° C. (103° F.). He was weak and listless and general icterus was noted. The splenic margin was palpable five centimetres (two inches) below the costal border.

His general condition, though serious, was not alarming.

His urine was of a deep port wine colour and had the appearances characteristic of blackwater fever. The signs of secondary anæmia were noted in the blood but there were no malaria parasites.

Treatment.

The treatment was the same as that prescribed for S.E.

Progress.

The temperature settled down to normal in three days. The general condition improved rapidly and patient was convalescent on the eighth day of his illness.

Though the conclusion does not necessarily follow, it might be suggested that this patient would not have contracted blackwater fever had he either taken quinine more regularly or observed sobriety at Christmas and New Year.

Unfortunately, no malaria parasites were demonstrated in the blood of any of the patients, hence the type of parasite with which they were infected could not be determined.

THE STANDARD OF CURE OF GONORRHOEA IN THE
MALE: WITH SPECIAL REFERENCE TO THE
PROBLEM OF THE PREVENTION OF
VENEREAL DISEASE.

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THERE has come about in recent years a very general appreciation of the fact that all the influence of research and administration ought to be applied to the prevention and cure of venereal disease and that all means of moral prevention ought to be constantly employed, especially with regard to the youth of the nation. While all are agreed as to these general principles, there is room for some divergence of opinion as to the merits and demerits of various measures recommended in order to attain a practical result. The most difficult aspect of the question is the social factor, which involves considerations such as this present late age of marriage and the centralization of population in towns.

At the present time there is a controversy in regard to certain measures of practical prevention, the efficacy of which is now the subject of experiment by the Ministry of Health in Great Britain. Experience of preventive schemes in the Army during the late war, while very valuable, is not always strictly applicable to the civil community.

Preventive depôts for this use of the civil community might be thought worthy of a trial, but two that were established in a large manufacturing town in England by way of experiment were recently closed after operating for two years. This suggests that the experiment was not a success. Further, the case for preventive packets is not encouraging. Even if they had proved an unqualified success among our troops abroad, it would not necessarily involve their success under altered conditions now.

In New South Wales there is a *Venereal Diseases Act* which is potentially a valuable measure, but it

will never produce a thoroughly practical result as far as gonorrhoea is concerned until the medical profession adopts an adequate standard of cure. As this condition is not possible unless the medical attendant has a good clinical knowledge of the subject, it presupposes better teaching of the clinical aspect of venereal diseases.

Some medical men place great reliance on the results of laboratory examinations, for there is still, unfortunately, a widespread faith in their finality as criteria of cure. This state of affairs is much to be regretted as frequently the patient judges the matter himself according to the result of the pathological examination. In addition, from the medical point of view an undue reliance placed by the medical attendant on occasional laboratory tests is bound to make him neglect the more important clinical side of the picture.

It is useless to expect universal public support and sympathy in a campaign against venereal diseases until the medical profession sets its own house in order and in this connexion the adoption of a scientific and practical standard of cure is an indispensable preliminary.

It may be said at the outset that the chief difficulty lies in the appearance of cure achieved by many individuals and the false sense of security thus imparted to the sufferer.

The standard of cure described hereunder is thoroughly practical and is sufficiently rigid to include all cases, without being unduly irksome to the patient.

History of Infection.

In investigating a patient it is necessary to be orderly and systematic. The first step is to take a careful history of previous infection, attention being paid to the length of time since there were any symptoms or signs. Usually but not always the gonococcus dies out within two years of the primary infection. There may be a history of inflammation of the posterior part of the urethra complicated by prostatitis, vesiculitis, epididymitis, orchitis, arthritis or iritis, in which case particular attention should be directed to the examination of the posterior portion of the urethra and its adnexa.

Chronic vesiculitis, even when apparently cured, may leave a train of such symptoms as pains about the sacrum, testis, groins and inner surfaces of the thighs, which are worse when at rest. A patient, interesting in this connexion, was seen by one of us in a demonstration by J. E. R. McDonagh at the London Lock Hospital; the patient who suffered from chronic purulent vesiculitis, had been mistakenly treated for twenty years for lumbago by massage, liniments and the like.

The epididymis sometimes remains very indurated after infection and occasionally there is a history of recurrent epididymitis. Under these circumstances the complement function test may yield a positive result, signifying that the epididymis is not free from gonococci.

The next step is to note the method of treatment adopted in previous infections. Those treated by

injections of silver salts are most liable to relapse. We consider that the silver salts are contraindicated in acute gonorrhœa, owing to their tendency to cause infiltrations.

Physical Examination.

Discharge.

The patient having presented himself with a full bladder, the urethra is gently massaged and a discharge looked for. So long as a definite urethral discharge exists, there can be no question of cure. Examination of urethral discharge for gonococci, while frequently carried out, affords very little information. In cases of chronic gonorrhœa the intermittency with which the gonococcus appears in the discharge, is well known to those who are in the habit of looking for it. Moreover, in these cases while examination of a smear for gonococci may appear a simple enough procedure, it is not by any means free from possibility of error.

The Urine.

The urine is next passed into a jar and examined for the presence of shreds. It is important to understand the significance of these, for provided the patient has not been over-instrumented, they show that an inflammatory process still exists and that further treatment is necessary. There is not much importance to be attached to the culture of shreds, for when present the patient is clinically uncured.

Rectal Examination.

The seminal vesicles and prostate gland are next examined *per rectum*. During this procedure the patient should hold a beaker of water under the penis, in order to catch the expression from these glands. Any enlargement or induration is first noted and then an expression is obtained by systematic massage. An inflammatory condition of these glands can at once be recognized by the flakes or casts which are suspended in the water. A microscopic examination should also be made of the expressed drop. The presence of pus cells naturally indicates an inflammatory condition, but strangely enough gonococci are rarely detected. This fact does not suggest that these conditions are non-gonococcal, for sera from these cases usually react to the gonococcus complement fixation test.

Cowper's Glands.

The patient should then be placed in the lithotomy position and Cowper's glands palpated. When chronically enlarged, they may attain the size of a marble.

Instrumental Examination.

The instrumental examination is in many ways the most important procedure in determining the cure. Nowadays it is generally accepted that the treatment of gonorrhœa is not complete without final dilatation of the urethra and urethroscopic examination. In our experience in the vast majority of patients in whom gonorrhœa relapses, the urethra has never been dilated. Metal sounds are passed

not only to prevent the formation of any infiltration or to disperse a commencing stricture, but also to promote efficient drainage from urethral adnexa during the chronic stage of the disease. The urethral canal should be dilated to about No. 24, French measure, the Clutton pattern of instrument being preferred. With the instrument *in situ* it is possible to palpate the canal and to feel any infiltration or indurated glands of Littre. These latter appear as seed-like bodies, usually situated on the dorsal wall of the urethra. Both these conditions are an indication for treatment, as they may at any time result in a relapse. The gonococcus frequently underlies stricture formations and therefore in these cases an opinion as to freedom from infectivity should be guarded. As there is sometimes an undue constriction at the meatus or neck of the *fossa navicularis*, it may become necessary in order to dilate the urethra efficiently, to perform a meatotomy; this simple procedure may be carried out under local anaesthesia.

Urethroscopy.

The next step in the procedure is urethroscopy. An essential preliminary to urethroscopy is adequate dilatation of the urethra. This method of examination affords a most precise means of telling if the patient is liable to relapse. The Luys pattern of instrument is satisfactory, a straight tube being used for examination of both the anterior and posterior portions of the urethra. The mucous membrane of the posterior portion of the urethra reflects the condition of the adnexa and this fact is so striking that the *verumontanum* has been aptly named the "mirror of the seminal vesicle." Where abnormalities appear on its surface, it indicates an inflammatory condition in the adjoining vesicles. Infiltrations, strictures and cystic formations in urethral glands and sinuses may readily be seen, but the commonest and most important lesion is found in the anterior urethra in the form of chronically inflamed glands of Littre. These frequently occur in patients who otherwise appear to be cured, but they are nevertheless a potential source of relapsing gonorrhœa. If not surrounded by distinct inflammatory induration they cannot be palpated; therefore the only means of detecting them is by urethroscopy. Their presence is frequently not attended by symptoms or else these may be slight, in which case the usual complaint is of an occasional "pinprick in the pipe." The most practical line of treatment is to cauterize the neck of the inflamed gland by an electro-cautery. In the subsequent process of repair of the cauterized area the urethra is shut off from the gland which then atrophies.

Other means having a limited sphere of usefulness as criteria of cure and advisable in some cases are the provocative injection of one hundred millions gonococci in freshly prepared suspension and a provocative urethral irrigation of a 0.1% silver nitrate solution. A focal reaction is then looked for.

The Complement Fixation Test.

The complement fixation test should be regarded as a very important part of any standard of cure.

In order to interpret the test successfully, one must regard a positive result as implying an efficient immunity response on the part of the tissues.

As the serum reaction may outlast the clinical cure by several weeks or longer, a positive result in a patient who has recently undergone treatment is simply an indication to repeat the test later. But if the reaction is persistent, it means there is a focus of infection, usually in the posterior portion of the urethra. Under these circumstances, even if a first examination has not provoked a reaction a more searching examination will usually reveal the existence of an inflammatory process. In some cases gonococci may remain in the seminal vesicles or in the tubules of the epididymis for many years. A failure to react on the part of a serum which previously reacted, may be looked upon as strong presumptive evidence of cure.

If, however, only a single observation is available, a failure of the serum to react means, as a rule, either that the patient is cured or else that the focus of infection, if present, is confined to the anterior portion of the urethra.

It will thus be seen that the complement fixation test may yield most valuable information and it is inadvisable that a patient should be pronounced fit for marriage unless the serum has been examined and has failed to react to the test.

Summary.

It is perhaps necessary to call attention to the necessity of viewing this method of examination in its proper perspective. There is no certain single criterion of cure and therefore it must be apparent that the clinical investigation is more important than any method of laboratory examination and must form the fundamental basis of any standard of cure.

In laying down a standard of cure our aim must be to adopt a procedure which will enable us to be reasonably sure that the patient will not suffer any relapse, to protect him from any future sequelæ, to assure him that he is non-infectious and last but not least, to inconvenience the patient as little as possible. Some standards err on the side of being too low, while others are so high that no ordinary patient will submit to them; those who do, become miserably introspective, suffering all manner of tests and finally interpreting these for themselves, often with much originality and inaccuracy.

The necessity for an accurate standard of cure arises from the variable natural immunity with which patients are endowed. Many men who suffer from gonorrhœa, will get well whatever method of treatment is employed or even with no treatment at all, for the simple reason that they are endowed with a high degree of natural bodily protection. In others the natural immunity to the gonococcus is of a low order; therefore after apparent cure the disease is liable to relapse as a result of any circumstance which further lowers their immune powers, as for example the ingestion of alcohol.

Any standard of cure adopted must therefore be sufficiently high to include these individuals because it is chiefly through them that the disease is spread.

Summarized the standard of cure to which a patient should conform, may be expressed as follows:

1. There should be no meatal discharge.
2. The urine should be clear and free from shreds and filaments.
3. A clinical examination of the seminal vesicles and prostate gland should not reveal any abnormality and the expression from these glands should be free from pus cells.
4. The passage of curved sounds of adequate size should not provoke any reaction nor reveal any abnormality in the walls of the urethra.
5. On urethroscopic examination the urethral mucosa should appear normal.
6. The blood serum should not react when examined by the gonococcus complement fixation test.

Reports of Cases.

A RUPTURED APPENDIX IN A WOMAN EIGHT MONTHS PREGNANT.¹

By P. L. HIPSLEY, M.B., Ch.M. (Sydney),
Honorary Assistant Surgeon, The Royal Hospital for Women, Paddington; Honorary Surgeon, Royal Alexandra Hospital for Children, Camperdown, Sydney.

RUPTURE of a gangrenous appendix at the end of eight months of pregnancy is a sufficiently rare event to warrant the report of the following case.

Clinical History.

H.F., aged twenty-eight years, was admitted to the Royal Hospital for Women, Paddington, on May 25, 1925, complaining of severe abdominal pain of twenty-four hours' duration. Vomiting had occurred once since the onset. The patient had suffered from a similar attack one month prior to admission and this had subsided in about a week. The patient had been married for nine years. She had three children, the eldest was eight years old and the youngest four. She had had no miscarriages. On examination the uterus was found to be the size of an eight months' pregnancy. Tenderness was present all over the abdomen, but was most noticeable over McBurney's point. Some muscular rigidity was also present in this region. The patient's temperature was 38.9° C. (102° F.) and the pulse rate 120 in the minute. The tongue was moist and coated. The urine was free from pus and albumin.

At operation the usual muscle splitting incision was made over McBurney's point and on opening the abdomen free pus was found together with a gangrenous appendix perforated near its base. The appendix was removed without difficulty as the caecum could readily be delivered through the incision. A rubber drainage tube was inserted through the outer angle of the wound which was closed around it. The tube was gradually shortened and was removed on the seventh day. The wound healed at the end of about fourteen days. The patient left the hospital three weeks after operation although she was urged to remain until after the confinement. She returned a few days later complaining of intense abdominal pain and her condition was somewhat similar to that seen on admission on the first occasion. This time, however, she was in labour. The head was fixed and the *os uteri* was dilated to the size of

¹ Read at a meeting of the New South Wales Branch of the British Medical Association on July 9, 1925.

two fingers' breadth. She was given a hypodermic injection of 0.015 gramme (a quarter of a grain) of morphine. Later on as labour was not progressing satisfactorily a small de Ribes bag was inserted and was expelled four hours later. This was soon followed by the birth of a poorly nourished infant weighing 2.7 kilograms (six pounds) which lived only a few hours. The first six days of the puerperium were quite normal. On the seventh day the abdominal incision broke down slightly and discharged pus for a few days and then healed again. The patient's temperature at this time was 37.8° C. (100° F.) and the pulse rate 80 in the minute. On the tenth day the patient complained of abdominal pain and the abdomen was slightly distended. The temperature was still about 37.8° C. and vomiting commenced. The patient looked very ill and presented all the signs and symptoms of a partial intestinal obstruction.

I decided to open the abdomen as I considered that the obstruction was probably due to a loop of small bowel having become adherent to and kinked by the involuting uterus. The abdomen was reopened in the middle line and the whole bowel was found to be distended and intensely injected. There was a quantity of brownish fluid in the peritoneal cavity. Portion of the small bowel was adherent to the uterus and on freeing this a quantity of pus was set free. A large rubber drainage tube was inserted extending down beyond the uterus and the wound was closed around it. At the present time, nine days after the operation, the patient is still very ill, but is improving daily and promises to make a good recovery.

Comment.

The mortality associated with rupture of the appendix during the last two months of pregnancy is very high owing to the fact that labour is apt to set in soon after the operation and that as the uterus contracts, adhesions which have been limiting the spread of infection, are broken down and general peritonitis results. Some years ago I operated on a patient whose history was somewhat similar to that quoted above. Labour came on seven days after the operation and the patient died six days later from general peritonitis. From the experience gained from these two cases I am of the opinion that the best treatment would be to remove the appendix as early as possible and later on when labour begins, to remove the uterus with the fœtus intact or to treat the uterus as in the Porro Cesarean section operation. At the same time I would drain the pelvis through Douglas's pouch.

Post Scriptum.

The patient whose history is here reported, died on August 24, 1925. She appeared to be doing well for about three weeks, then her temperature rose to 38.9° C. (102° F.) and the abdominal distension became more pronounced. She suffered from a cough and signs of congestion appeared at the base of both lungs. She gradually became more and more wasted and further surgical treatment was not considered advisable.

A *post mortem* examination was carried out by Dr. Harrison. On examination of the heart pericarditis with effusion was found. The apex of the right lung appeared normal. The lower and middle lobes were affected by a condition very similar in appearance to acute miliary tuberculosis. The apex of the left lung was normal. The lower portion of the upper lobe and the lower lobe were in a similar condition to that seen in the base of the right lung. Old pleurisy with adhesions in both pleural cavities was found. There was a loculation of pus below the lower lobe on the left side communicating through the diaphragm with another collection of pus between the diaphragm and the spleen.

General peritoneal adhesions were found except over the liver. There was a loculation of sero-pus extending from below the umbilicus up to the liver. The sinuses from the two wounds extended to the large bowel, the sinus from the appendix wound going down to the caecum and that from the wound in the middle line down to the sigmoid. The liver was enormously enlarged, it extended nearly down to the umbilicus and was the seat of fatty degeneration. The gall bladder contained a muddy fluid.

The spleen was covered with a thick layer of lymph due to a recent perisplenitis and it bounded the abscess above it. It was somewhat enlarged and purple in colour. The bowel and stomach were bound together by adhesions. The uterus was well involuted and nearly normal in size.

AN UNUSUAL CASE OF STRANGULATION OF THE GUT.

By ARTHUR A. PALMER, M.B., Ch.M. (Edin.),
F.R.C.S. (Edin.),

The Government Medical Officer, Sydney.

THE following case might be described as one of strangulation of the small gut by the large.

A girl, aged seven years, retired to bed at 9 p.m. in her usual good health and spirits. About 1 a.m. her parents were awakened by her crying and complaining of pain in the belly. Hot flannels were applied and about 4 a.m. she appeared to be much easier. The treatment was continued, but at 7 a.m., when taking a drink of water, the patient collapsed and died.

On opening the abdomen at the morgue I found that the peritoneal cavity contained much blood-stained fluid. The whole of the small intestine with the exception of the first sixty centimetres (two feet) and the last few centimetres, was of a dark plum colour. Crossing the top of the mesentery and then encircling it were two firm, whitish cords about the size of the little finger, one coming downwards and to the right from the spleen, the other upwards and to the right from the left iliac fossa. These cords were the firmly contracted colon, descending and iliac. After encircling the mesentery the colon passed beneath its own loop and so strangled itself or rather that part of itself which passed through to beyond the loop. This piece of strangled colon about five centimetres (two inches) long was not of such a dark colour as the small gut, but was greatly distended with gas which had to be let out before the strangulation could be released. The mesentery of the colon was then found to be about twenty centimetres (eight inches) in length. The colon could be carried out of the body to the right till it just rested on the table.

This must, I think, be a very rare variety of strangulation. The descending and iliac colon are not as a rule furnished with a mesentery after birth and when a mesentery is present, it is usually short. Had the patient come to the operating table, the surgeon would no doubt have found the condition a very puzzling and difficult one.

Reviews.

THE MIND.

IN the introduction to his book on the mind in health and disease, Dr. T. Waddelow Smith states that he has tried to stimulate the interest of both students and general practitioners, but he infers that in no sense is the publication to supplant the many excellent text-books now written on this subject.¹

He bases his psychology upon the works of Freud, but strongly emphasizes the claims of physiology, biology and endocrinology. Having attempted to correlate the most modern views of the exponents of each, he admits that his conclusions are still purely hypothetical but justifies his action on the score of clearness. For the student with knowledge and capability of logical criticism such a procedure is worth while, if only to demonstrate how far

¹ "An Introduction to the Mind in Health and Disease: For Students and General Practitioners Interested in Mental Work," by T. Waddelow Smith, F.R.C.S. (England). 1925. London: Baillière, Tindall & Cox. Demy 8vo., pp. viii. + 236, with six coloured plates. Price: 10s. 6d. net.

from perfect is an explanation of the mind upon these lines, but for the tyro it is of questionable utility as it gives an impression of "fact" in place of what is really "scientific fiction."

To give but two examples, the author's definition of emotion as "the reaction of the cells in the association areas of the brain to kinetic drive of the sympathetic division of the vegetative nervous system" is highly epigrammatic, but the uninformed reader might well miss the fact that we are still ignorant of the basis of emotion. Or again to treat the mechanism of *dementia præcox* as due to "the inhibitions from repressed complexes by the vegetative nervous system deranging the functioning of the endocrine glands and smooth muscles with disastrous results" . . . is onesided to say the least of it.

The author has an amazingly complete command of the "new psychology" terminology, a feature which will commend itself to those who follow this school. His reverence for psycho-analysis is profound as is shown by the following: "I almost think that no one should dare to practise it before, if he be a man, the age of fifty!"

Credit must be given to the author for his transparent enthusiasm in dealing with an admittedly difficult subject, that he is not more successful is due rather to the incompatibility of much of his material than to lack of skill in its presentation.

CONSTRUCTIVE BIRTH CONTROL.

DR. MARIE STOPES has published the first report of "The Mother's Clinic" for constructive birth control.¹ The list of patrons of the clinic shows that it has the support of several well known men and women both in and out of the medical profession.

Of the five thousand attendances in the period covered by the report four thousand nine hundred and forty-six were of married women, two of unmarried mothers and fifty-two of betrothed couples about to be married.

It is said that because of the pressure on the space and time at the clinic a rule has been made that only those who had borne one child should be given the clinic's fullest help and personal investigation.

One hundred and sixty-six of the five thousand attendances were of childless women who wished information as to becoming pregnant.

It is satisfactory to note that a statutory declaration has to be made by members of the staff not to impart any information or give any instruction calculated to lead to the destruction *in utero* of the products of conception.

The authoress gives it as her opinion that the clinic should deal only with contraception for normal women and that contraception for the diseased should be dealt with at hospitals with clinics in out-patients' departments. Later on she states that she does not consider that more birth control clinics as independent institutions should be necessary. "The obvious and proper places for the poorer classes to obtain contraception information are the antenatal clinics and the infant welfare centres and the hospital which they may be attending."

The latter part of her declaration is not likely to give rise to much dissent, but the desirability of imparting contraception information to normal women is more questionable and an organization for this purpose is not likely to have the general support of the medical profession.

A HANDBOOK FOR TUBERCULOUS PATIENTS.

In a little treatise called "Recovery Record for Use in Tuberculosis," Dr. Gerald Webb and Dr. Charles Ryder have in a few interesting pages condensed the essential factors for the guidance of consumptives undergoing treat-

ment and charts are supplied for daily records over a period of two years.¹

The technique of recovery is based on rest and pains have been taken to explain what rest means and its close relation to improvement; while the temperature and pulse must be chief guides as to the extent of such improvement.

The period of convalescence is not overlooked, warning being given against too rapid an increase of exertion, if relapses are to be avoided, while the value of amusements is recognized.

The importance of fresh air, diet, bodily warmth, cleanliness and regular habits are briefly discussed from the patient's aspect, while simple advice as to coughing and expectoration, with rules for the protection of others, are given.

Patients are advised how to overcome their lesser ills as headache, dyspepsia or nervousness and how to guard against the more serious complications such as hæmoptysis.

As a guide to consumptive patients this little book should prove most valuable and no consumptive should be without its help.

INFANT FEEDING.

"ESSENTIALS OF INFANT FEEDING," a small book of less than eighty pages, is written by Dr. E. A. Barton for the use of students attending hospital infant clinics.² The author's object is to give the main outlines of infant feeding in small compass and at small cost. In the first part breast-feeding is discussed. The difficulties met with during lactation are scarcely mentioned and no information is given with regard to methods of reestablishing a failing milk supply. These are points on which the student needs instruction and more space might have been given to the consideration of them. The composition of milk and the methods of modifying it to meet the requirements of the infant are described in the second part. Artificial feeding is the subject of the third and last chapter. In spite of the difficulty of the task essayed by the author the student will find here described methods and principles which, taken in conjunction with practical experience, should be of use to him.

SEXUAL PROBLEMS.

MISS ETTIE A. ROUT has published a booklet containing two lectures on sexual health and birth control.³ These lectures were delivered before the National Secular Society in Manchester and bear internal evidence of their adaptation to the audiences to whom they were addressed. Miss Rout is an ardent advocate of the control of venereal infection by the use of the preventive packet. In this she has the support of very many members of the medical profession who are qualified to judge of its efficiency. It is recognized that the ideal of antemarital continence—the only certain way of prevention—is not yet realizable and any other reasonable method of preventing the disastrous results of venereal infection should be adopted.

It is a pity that the lectures should contain so much abuse of opponents of the authoress's views. The case for prevention is strong enough to stand on its merits and is damaged rather than improved by such methods.

In the lecture on birth control the arguments used are much the same as those employed by Dr. Marie Stopes, though there are differences of opinion as to the exact methods to be used.

One of the dangers of such methods which has been emphasized is that they may be employed by single women

¹"The First Five Thousand," by Marie Carmichael Stopes, D.Sc., Ph.D., F.L.S.; 1925. London: John Bale, Sons & Danielsson, Limited. Crown 8vo., pp. 67. Price: 2s. 6d. net.

²"Recovery Record for Use in Tuberculosis," by Gerald B. Webb, M.D., and Charles T. Ryder, M.D. Second Edition, Revised; 1925. New York: Paul B. Hoeber, Inc.; Demy 8vo., pp. 79. Price: \$2.00.

³"Essentials of Infant Feeding," by E. A. Barton (Medical Officer to the Child Welfare Department, University College Hospital); 1925. London: H. K. Lewis & Company Limited. Crown 8vo., pp. viii. + 80. Price 3s. 6d. net.

⁴"Sexual Health and Birth Control," by Ettie A. Rout: Foreword by Sir Bryan Donkin, M.D.; 1925. London: The Pioneer Press. Crown 8vo., pp. 71. Price 1s. net.

who are afraid of the possible consequences of their action. Miss Rout while regarding monogamy the ideal relationship between man and woman, says: "Whether women would be more inclined to settle down happily and comfortably in a permanent marriage if they had a wider sex experience prior to marriage, remains to be proved. The modern girl would seem to be putting the matter to the practical test and those of us who have had experience and reached maturity must just wish her well and give her brave and honest guidance when such is desirable and acceptable. She is claiming personal liberty of action. On what grounds can that be refused?"

There seems to be considerable justification for the attitude of the opponents of "birth control."

ORTHOPÆDIC SURGERY.

As a textbook, Royal Whitman's "Orthopædic Surgery" continues to hold well deserved popularity.¹ It is certainly one of the most complete books written on the subject. The present edition is the seventh and in it a special feature is made of the operations associated with the author's name, namely astraglectomy and the abduction treatment in fracture of the neck of the femur. The text is up to date in other respects, however, and the most recent additions to orthopædic surgery are to be found in it. A feature is made of what the author calls "Collateral Orthopædic Surgery." This chapter which was originally entitled "Military Orthopædics," has been retained and extended because it seemed to contain material of collateral interest to the readers of a treatise of this character. Under this heading are included treatment of fractures, amputations and artificial limbs, peripheral nerve injuries and a section entitled "Attitude of Election." In this the most desirable positions for recovery are discussed together with suitable splints.

COLLOIDS.

A SOMEWHAT petulant protest against the use of the results of research without acknowledgement does not favourably impress at the outset the reader of Dr. Kopaczewski's second volume on the pharmacodynamics of colloids.² This book is divided into two parts, the first dealing with protein therapy and the second with transfusion of blood. The exposition of protein therapy consists chiefly of arguments to sustain the author's thesis that the results of this treatment are due entirely to humoral shock and further that protein shock is only one form of colloid shock. The second part on transfusion is better handled and is a useful essay on the subject. The author pleads for caution in transfusion, pointing out that we have not yet unraveled the intricacies of grouping. There is matter for research here on purely physical lines, many of the phenomena of shock following transfusion and of protein shock in general may be explainable by the degree of colloid dispersity. Active agents can be classified according as they favour or oppose increased dispersion. One of the best features of the book is the excellent bibliography which is entirely of post-war publications.

PHYSIOTHERAPY.

"PHYSIOTHERAPY IN GENERAL PRACTICE," by E. Bellis Clayton is, as stated in the preface, intended for the general practitioner and the masseuse.³

The description of the medical aspect of the work is simple and capable of being easily understood even by

those who do not possess a profound knowledge of anatomy and physiology.

The treatment of the conditions dealt with in the physiotherapy department is excellent. It is very complete and concise. The exercises advised are clearly described and the crawling exercises at the end of the book are well illustrated.

We cannot agree with the statement on page 127 that massage can generally be commenced in infantile paralysis after a fortnight.

Altogether we consider that this work can be recommended as a book particularly useful for masseuses.

Analytical Department.

"TRICALCINE."

THE estimation of the therapeutic value of a new remedy usually offers great difficulties on account of the fact that only under exceptional circumstances is it possible to apply quantitative scientific tests. While we recognize that clinical observation, if carried out by experienced and skilled physicians, demands our attention as a reliable gauge, this method is a very slow one, since the element of suggestion cannot be eliminated from the verdict until the remedy has been used by a large number on very many patients. When the remedy contains a chemical substance that has long been employed pharmacologically, the prospects of having an objective criterion on which the estimate can be based, are better. It is necessary to exercise caution in applying theoretical considerations, for theory may be misleading.

A preparation named "Tricalcine" has been submitted to THE MEDICAL JOURNAL OF AUSTRALIA for investigation by the manufacturers, The Products Scientia Laboratory, Paris, through their agents, Messrs. W. Prestre and Company, of Sydney. "Tricalcine" is offered in four forms: "Tricalcine pure en poudre," "Tricalcine pure en comprimés," "Tricalcine méthylarsinée" and "Tricalcine adréalinée." These preparations have been subjected to a chemical analysis in order to determine their chemical constitution and to ascertain whether on *a priori* grounds there appears to be justification for the claims made for "Tricalcine" by the manufacturers. We have also requested a few competent clinicians to employ the preparations in their practices and to submit a report on their findings. That these clinical tests extending over a relatively brief period are quite insufficient to enable the medical profession to form an accurate opinion concerning the therapeutic value of the preparations is obvious.

Chemical Analyses.

"Tricalcine pure en poudre" is an amorphous powder, tasteless and odourless. It does not dissolve in cold water and does not alter the reaction to litmus of the water. It imparts an alkaline reaction to water after prolonged boiling. On evaporation to dryness the water was found to contain a trace of soda. No soluble phosphates were present in the residue. "Tricalcine" dissolved completely in dilute hydrochloric acid with effervescence. It yields the usual reactions for carbonates, phosphates, calcium, magnesium and sodium. It does not respond to the tests for chlorides, sulphates, lactates, hypophosphites or for any other acid radicles. It exhibits no reactions for other bases. None of the British Pharmacopœia tests for the presence of barium, ammonium, silicon, copper or lead yielded any evidence of the presence of these substances. The powder does not alter in appearance or colour on powerful heating. It loses approximately one-third of its weight on heating to bright redness in a muffle furnace. On drying at 100° C. it loses practically no water.

The analysis of the dried powder yielded the following figures:

Carbon dioxide (CO ₂)	34.1%
Phosphorus pentoxide (P ₂ O ₅)	11.1%
Calcium oxide (CaO)	54.1%
Magnesium oxide (MgO)	less than 1%

¹ "A Treatise on Orthopædic Surgery," by Royal Whitman, M.D., M.R.C.S., F.A.C.S.; Seventh Edition, thoroughly revised; 1923. Philadelphia and New York: Lea and Febiger. Demy 8vo., pp. 1005 with 877 illustrations. Price: \$9.00 net.

² "Pharmacodynamie des Colloïdes," by W. Kopaczewski; Tome II: Proteinotherapie et Transfusion du Sang; 1925. Paris: Librairie Octave Doin. Crown 8vo., pp. xii. + 327.

³ "Physiotherapy in General Practice and for the Use of Masseuses," by E. Bellis Clayton, M.B., B.Ch. (Cantab.); 1924. London: Baillière, Tindall and Cox. Demy 8vo., pp. viii. + 174, with illustrations. Price: 10s. 6d. net.

These results indicate that pure "Tricalcine" powder consists of a mixture of calcium carbonate and tribasic calcium orthophosphate in the proportions of approximately three parts by weight of the former (CaCO_3) and one part of the latter ($\text{Ca}_3\text{P}_2\text{O}_8$). The amount of magnesium present is such as to make the magnesium salts equivalent to about 2% of the total weight of the powder.

The tablets of "Tricalcine" ("Tricalcine pure en comprimés") weigh a little more than one gramme. The weight of the individual tablets varied not inconsiderably; eight tablets on every occasion weighed less and nine weighed more than ten grammes. The white powder obtained by crushing the tablets was found to be odourless and to be sweet to the taste. Analyses revealed that the powder consists of "Tricalcine," that is calcium carbonate and normal calcium orthophosphate with a little magnesium salt, mixed with sucrose and some talc. The "Tricalcine" represents a little more than half of the mass, the sugar is approximately 45% and the talc (magnesium silicate) less than 3%. There is no reducing sugar in the powder. Each tablet contains rather more than sixty-five decigrammes of pure "Tricalcine." No other substance was detected in the tablets.

The following figures were obtained as a result of the analyses of the dried powder from "Tricalcine pure en comprimés":

Sucrose	45.1%
Insoluble in dilute hydrochloric acid (talc)	2.9%
Carbon dioxide (CO_2)	18.3%
Phosphorus pentoxide (P_2O_5)	4.8%
Calcium oxide (CaO)	30.0%

It thus appears that the calcium carbonate content of the "Tricalcine" used in the preparation of the tablets is slightly higher than that of the powder.

"Tricalcine methylarsinée" is offered for sale in cachets. Each cachet contains about 7.5 decigrammes of powder, but here again there is a slight variation in weight. The cachets themselves weigh about eighty-five milligrammes each. The variation can be gauged from the fact that the lowest weight of six cachets was less than five grammes (instead of 5.11 grammes) and the highest weight of eight cachets was over seven grammes (instead of 6.68 grammes). In each cachet was a white powder composed of calcium carbonate, normal calcium orthophosphate and either carbonate or phosphate of magnesium in the same proportions as in pure "Tricalcine." In addition there is sodium arsenite. Each cachet contains 2.7 milligrammes of arsenic. The analyses yielded the following figures:

Arsenic	0.36%
Carbon dioxide	32.8%
Phosphorus pentoxide	11.3%
Calcium oxide	53.8%
Magnesium oxide	less than 1%

Some analyses were made of "Tricalcine adréalinée" which is dispensed in cachets. It is stated that three drops of a 1% dilution of adrenalin is contained in each cachet. The analyses revealed that the "Tricalcine" contained in these cachets is of the same composition as in the other preparations. Each cachet contains approximately 7.5 decigrammes of pure "Tricalcine." The attempt to demonstrate either by chemical or by physiological means so small a quantity of adrenalin as 0.0001 gramme of adrenalin failed.

The preparation has obviously been carried out carefully and chemical substances of pure quality have been used. The variation of the amount of "Tricalcine" in the tablets and in the cachets seems to be due to the employment of volumetric measurement without complete drying of the "Tricalcine" powder and sugar or of the powder alone. The variations are of small consequence in view of the doses of the calcium compounds. The quantity of arsenic is constant and this may be accepted as evidence of the care taken to insure exactness when weighing is used.

Clinical Trials.

There are certain methods available for estimating the pharmacological or physiological effects of calcium salts

when taken into the body. In the first place it is possible to ascertain the proportion of the calcium absorbed. The manufacturers claim that 85% to 90% of the calcium in "Tricalcine" is absorbed. Unfortunately none of the physicians who have used the preparations at our request, have attempted to control this question.

In the second place it has been determined that calcium tends to diminish the number of eosinophile cells in the blood when these are increased. "Tricalcine" was given to patients suffering from asthma without any evidence of hypersensitivity to foreign proteins. Of four patients one deserves mention. The leucocytes numbered seven thousand per cubic millimetre. Of the leucocytes 8% were eosinophile cells. After treatment with "Tricalcine" the asthma ceased and the eosinophile cells were reduced to 3%. Further observations are needed in conditions associated with eosinophilia, including asthma.

The third objective effect of calcium medication is in lead poisoning. While "Tricalcine" was given to two men suffering from severe colic caused by lead poisoning which resisted treatment under magnesium sulphate and potassium iodide, neither patient reported himself after the treatment with "Tricalcine" was prescribed. Here again further observation should be made.

In these circumstances it is necessary to rely to some extent on general clinical impressions. Although the time during which the trials were carried out was short and the amount of the preparations supplied to the physicians was not large, "Tricalcine" was given to patients suffering from a considerable variety of affections. With one exception the impression gained was that "Tricalcine" acts beneficially in all conditions in which calcium is indicated. In *pruritus ani* of an extremely intractable type temporary improvement followed the exhibition of "Tricalcine," notwithstanding the fact that all other medical, X ray and surgical measures had been ineffectual. In another patient considerable amelioration was obtained, while in a third all the symptoms were removed. Similarly "Tricalcine" was given for urticaria and the attacks which had been recurring every night in spite of careful treatment, disappeared permanently within forty-eight hours.

In pulmonary tuberculosis some benefit appears to have followed. Of ten patients treated with "Tricalcine" four responded with a definite and unmistakable improvement of both signs and symptoms. The cough lessened, the pyrexia was reduced, the vomiting ceased and the appetite returned. In the other six no improvement was noted. Three patients suffering from chronic affections of the chest with profuse watery expectoration improved under "Tricalcine" treatment. The sputum became lessened in quantity and all the patients gained in weight. Two others were uninfluenced by the treatment.

In neurasthenia and similar conditions "Tricalcine" with arsenic has apparently been serviceable. Benefit followed its administration in individual cases of vomiting of pregnancy and some affections in children.

Conclusions.

From the evidence before us we are justified in stating that "Tricalcine" is a carefully compounded preparation of calcium carbonate and tribasic calcium orthophosphate, that the calcium is readily absorbed and that a definite therapeutic action is obtained if large doses are administered for a considerable time. Further trial by the medical profession will determine more exactly the therapeutic value of "Tricalcine" in reducing eosinophilia, in immobilizing lead in the system and in restoring a disturbed calcium balance. The claims made by the manufacturers are sanguine, a little oversanguine, perhaps. They err to some extent in their physiological deductions and they are not quite consistent in all their directions. On the other hand there is no doubt that the calcium contained in food is not always either sufficient in quantity or suitable in form for the needs of the body. Calcium medication may be of considerable service and for this reason it is probable that "Tricalcine" will prove to be a useful preparation in several pathological affections.

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The Medical Profession and Industrial Hygiene.

IN the present issue will be found an admirable article by Professor H. G. Chapman on industrial hygiene, a summary of the discussion which followed the reading of this article before the members of the New South Wales Branch of the British Medical Association and a brief note dealing with the consideration by the Federal Committee of the British Medical Association in Australia of two problems connected with industrial hygiene. Professor Chapman defines industrial hygiene as the science of improving the health of persons employed in various occupations. It will be noted that he recognizes a fundamental difference between welfare work in industries and the practice of industrial hygiene.

The problems with which the Federal Committee concerned itself, are the qualifications needed for an industrial hygiene medical adviser and the terms of a satisfactory contract between the industrial hygiene medical adviser and employers of labour. There is no need to discuss the question whether the person charged with the supervision of the health of employees should or should not be a medical practitioner. If preventive medicine be the proper province of the medical practitioner, this particularly important chapter in preventive medicine must necessarily come within range of his activity. The suggestion has been made that the qualifications for an industrial hygiene medical adviser are the possession of common sense and some knowledge of what is termed "public health." Professor Chapman holds that the practitioner undertaking this work should undergo a course of training similar to that required for a diploma of public health. On the other hand the Federal Committee has expressed the opinion that at present no special course of training is needed, since the work is of a peculiar nature and no course in existence covers the duties that have to be performed. This opinion

will probably be shared by all who have given this subject careful thought, but it cannot be regarded as a final determination on a matter of national significance. If the subject be examined in wide perspective, it will be recognized that the objective of industrial hygiene is to improve the general standard of health of the working community and to lessen ill health, injury from accident in employment and incapacity. A healthy man or woman should be happy and contented at work and suffer no detriment on account of his or her labours. More than that, a person with some physical defect can and should derive benefit from employment. The problem with both the healthy and the defective individual is to adapt the work to him or her in such a manner that the objective may be attained. The first principle to be accepted is that no work is menial. Every branch of every occupation is essential. The miner getting coal from the face, the girl cutting and sewing button holes, the sorter at the post office, the carpenter fashioning a door, the watchmaker adjusting a chronometer are all performing services that are necessary. Some work demands more skill than others; some requires considerable physical effort, some much endurance, some infinite patience. But every bit of honest work is a contribution to the national and individual welfare. The second principle is that those who regulate and organize the work, must recognize that the workers as human beings have the right to conditions of work that are conducive to health and comfort. By this we do not mean that luxury is in place in industry. The employer demands an output of energy from those employed by him and he should realize that his obligations are not discharged when he pays the agreed wage. The place of work must be structurally suitable for men and women to spend hours in each day. The ventilation, lighting, state of repair, general sanitation, floor area and cubic space per employee and temperature must be adapted to human needs. Cleanliness is of paramount importance, for dirt and disease are close associates. It is usually possible to combine pleasant apartments for indoor work with a prosperous trade. A barrack, an overcrowded, dingy cellar, a cheerless, half furnished room too often serves as a work shop. No wonder

that discontent lurks in these sorry places and ill health follows closely in its train.

Apart from the environs of the work there are the tools of labour and the conditions under which men and women are asked to use these tools. The term tools is used in its broadest sense. An engineer does good work when in charge of a fine machine, if he be given sufficient time and opportunity to keep it in first class order. His pride in his machine and his delight in his work are obvious under such circumstances, with the result that his mental and physical health are maintained. There is no task in the industrial world so small or so insignificant that some delight and pleasure cannot be awakened in the breast of the worker by congenial and suitable conditions and mechanical aids.

The third task in industrial hygiene is the control of the state of bodily and mental health of each worker. In order that this may be effective, the adviser must study the trade, must gain the full confidence of each employee and must be competent to recognize any signal or warning that something is wrong in the adjustment. The hazards of the trade must be known and every possible precaution must be adopted to reduce these hazards to a minimum. There is no need for fear that the industrial hygiene medical adviser will usurp the rights of the general practitioner. If the work be properly performed, there should be coordination between the two.

Lastly someone in authority must infuse into the workshop, factory, house of business or other place of employment a feeling of personal interest and concern. The atmosphere should be full of confidence and frank collaboration. No one should feel that his or her work is of minor importance or that his or her person is inferior.

What school have we where these functions can be taught? There are many individuals who have grasped the full meaning of industrial hygiene and who are competent to impart their knowledge to others. We make the claim boldly that the time has arrived when professors of preventive medicine should be appointed at our three medical schools and that the first branch to be organized in their departments should be that of industrial hygiene.

Current Comment.

THROMBO-ANGIITIS OBLITERANS.

THE hybrid name of "thrombo-angiitis obliterans" was given by Buerger in 1908 to an occlusive thrombotic process involving the deep arteries and veins and the superficial veins of the extremities. Buerger claimed that this condition was a definite pathological entity entirely distinct from *end-arteritis obliterans* with which it was commonly confused. The name given by Buerger has been adopted by others and cases bearing this caption are reported from time to time in the literature. Buerger's views on this condition were set out in a recent review in this journal of his book "The Circulatory Disturbances of the Extremities Including Gangrene, Vasomotor and Trophic Diseases."¹ Buerger holds that the changes in this condition consist of an acute inflammatory lesion with occlusive thrombosis and the presence of purulent foci in the clot, the formation of miliary giant cell foci which may resemble those of tuberculosis, the organization of the clot, the disappearance of the inflammatory products and the development of fibrotic tissue in the adventitia binding together artery, vein and nerve. Cases of this condition reported in the literature have been usually of a chronic nature although as Buerger has pointed out and others have found, the process frequently advances by sudden exacerbations. The chronic nature of the disease is well exemplified in a case reported recently before the Royal Society of Medicine by Dr. F. Parkes Weber.² The patient, then a man forty-two years of age, was shown before the same society by Dr. Parkes Weber in 1907. He had then been suffering from symptoms of intermittent claudication for four years. In 1916 the *dorsalis pedis* arteries were affected and ischaemic ulceration resulted. During one attack the radial artery at the right wrist was apparently obliterated. In 1924 it was pulsating again. The patient suffered from gout and from signs of chronic nephritis. This according to Buerger is not part of the pathological process. He holds that the disease is independent of atherosclerosis or arteriosclerosis.

A report has been published by Dr. David Perla of forty-two cases of "thrombo angiitis obliterans" studied at the Montefiore Hospital, New York.³ Several interesting points are mentioned in this report. The cases fell into three groups, an early type affecting the lower limbs without gangrene, a chronic type with gangrene of one or both lower extremities and a chronic type with involvement of upper and lower extremities. In only two instances did Dr. Perla encounter "an acute phase" characterized by migrating phlebitis and cutaneous nodosities, such as are described by Buerger. Sections were cut from fifteen amputated extremities and all gradations of lesion were found in the peripheral vessels from completely organized and

¹ THE MEDICAL JOURNAL OF AUSTRALIA, May 16, 1925.

² The Proceedings of the Royal Society of Medicine, July, 1925.

³ Surgery, Gynecology and Obstetrics, July, 1925.

recanalized thrombi to fresh clots. The most definite histological changes were found in the *tunica intima* and were characterized by infiltration, thickening and proliferation. In early lesions the lumen was filled with a mass of fibrin and red blood cells into which young connective tissue cells were growing from the intima. The endothelium was occasionally still present. Dr. Perla thinks that this probably represented a subacute stage and states that in such cases the cellular infiltration of the vascular coats was more pronounced. In the older lesions a connective tissue mass extended from the internal elastic membrane and completely filled the lumen of the vessel. The endothelial lining was indistinguishable. The ground substance had a hyaline appearance and invading it from the intima were fibroblasts and connective tissue cells. In four instances associated arteriosclerotic changes were found; but Dr. Perla adds that the two diseases are unrelated. In regard to the chronicity or otherwise of the condition it is interesting to note that among the forty-two cases the duration of symptoms before the occurrence of gangrene or amputation was less than a month in two and fourteen years in one instance. In eleven the period of time was between one and two years. In discussing the condition Dr. Perla points out that the specificity of the "purulent and giant cell" foci as claimed by Buerger has been denied by Koyano and Krampf on the ground that they found similar lesions in acute thromboses following infections. Dr. Perla found early and late lesions in the same extremity and in no instance did he find this "specific" lesion. He states that it would be expected that the "specific" lesion would be found, because the final occlusion is often due to the superimposition of an acute on a chronic process. From a perusal of Dr. Perla's contribution it is not quite clear what he means by an acute process. The changes described by him as appearing in the vessels were regarded by him as subacute. He does not describe any "acute" lesions. It is the interference with the circulation that actually occasions most of the clinical manifestations and patients do not suffer directly from the disease, but from the occlusive thrombosis which must be regarded as Nature's method of healing a vascular lesion. At the same time it is interesting to note that Dr. Perla does not describe very distinctive changes in the *tunica adventitia*; he found "an infiltration with round cells and scattered plasma cells and occasionally fibrotic thickening." Apparently Dr. Perla accepts without question Buerger's view of the infective nature of the disease. He points out that the inflammatory reaction, the round cell infiltration and so forth suggest this. He refers to the work of Rabinowitz who claimed in 1924 to have isolated the causative organism from the blood stream. This has not been confirmed, but Dr. Perla regards the bacteriological aspect as the most promising field for research.

It must at the same time be remembered that the existence of a congenital abnormality or *Anlage* has not as yet been disproved. It is furthermore quite possible that such an abnormality might

be a necessary factor in a circulatory system which subsequently becomes the site of an infective process. Most of the cases of "thrombo angiitis obliterans" which have been reported, have been of a chronic nature. If an acute form of this or of an allied condition were described, it would certainly help towards the elucidation of the problem.

In this connexion it may be of interest to refer to a report recently made by Dr. Eli Moschcowitz of "an undescribed disease" which he terms "an acute febrile pleichronic anæmia with hyaline thrombosis of the terminal arterioles and capillaries."⁴ The patient was a girl, sixteen years of age, who became ill and complained of weakness, pain in the wrists and elbows and fever. Petechiæ appeared on the arm. The spleen was not enlarged. On the tenth day of illness the erythrocytes numbered 1,330,000 per cubic millimetre, the hæmoglobin value was 40% and the leucocytes numbered 12,600 per cubic millimetre. The polymorphonuclear cells were 65% of this total. No nucleated cells were seen. No platelet count was made. The following day the erythrocyte count was less and the leucocytes had increased in number. A blood culture remained sterile. The next day pulmonary œdema occurred, but responded to treatment, the patient became comatose and died. It is not necessary to describe the findings in great detail. The appearance of the heart muscle, however, is of much interest. With the low power numerous thrombi were found in the terminal arterioles and capillaries. The appearances varied with the amount of organization that had taken place. In the earliest lesions the vessel was plugged by a hyaline mass which either partially or completely filled the lumen. Usually the plug, if not in intimate contact with the wall of the vessel, was surrounded by a layer of flat cells of the fibroblastic type which was distinct from the endothelial intima. In older plugs the fibroblastic infiltration was more noticeable. Eventually a small fibroblastic tubercle-like structure was formed. In some the origin of the fibroblasts from the endothelium could be determined. The process of organization within the lumen was accompanied by a fibroblastic process around the wall of the vessel in concentric fashion. Dr. Moschcowitz points out that according to Flexner hyaline thrombi arise from agglutinated red cells. He concludes that death was caused by some powerful poison which had both agglutinative and hæmolytic properties.

While it is not suggested that the process in the case reported by Dr. Moschcowitz with lesions in the arterioles and capillaries is the same as that which obtains in the larger vessels in "thrombo-angiitis obliterans," there is a certain similarity between the conditions. The discovery of a relationship between the conditions or the complete or partial elucidation of one would aid in the determination of the nature of the other. On the whole the weight of evidence at present suggests that "thrombo-angiitis obliterans" is of infective origin with possibly a congenital predisposing abnormality.

⁴ Archives of Internal Medicine, July 15, 1925.

Abstracts from Current Medical Literature.

PHYSIOLOGY.

Factors Influencing the Knee Jerk.

W. W. TUTTLE (*American Journal of Physiology*, March, 1925) has made an extensive study of the knee jerk using refined methods and he has collected a number of interesting data concerning various factors which influence this reflex. An apparatus which automatically records the extent of movement of the leg, was used and also an apparatus which delivers uniform stimuli to a desired point at a constant rate. He found that an increase in the strength of the stimulus increases the height of the knee jerk until finally a maximum response is given. The extent of the knee jerk varies with the point of application of the stimulus, although there is no one position which can be assigned as the point where the highest jerks are obtained for all subjects. The highest jerk is most likely to be elicited when the stimulus is applied to either the patella itself, the inferior margin of the patella or the centre of the *ligamentum patellæ*. When the leg and thigh are "asleep," the condition of their tone approaches that of normal sleep. If the knee jerk is to be used as a diagnostic indicator in certain cord lesions or as an indicator of the tone of the nervous system, it is necessary to explore carefully the various areas whence the jerk may be elicited with a uniform stimulus of submaximal strength.

The Tonus of Muscle and the Sympathetic System.

A. ST. G. HUGGETT AND J. MELLANBY (*Journal of Physiology*, July, 1925) have investigated Hunter and Royle's hypothesis that the plastic tone of voluntary muscle is controlled by the sympathetic nervous system. In addition they have attempted to determine the effect of the parasympathetic and somatic systems of nerves on the normal tonus of voluntary muscle and the exaggerated postural tonus of the decerebrate cat. They made use of the broad generalizations that in physiological doses (a) adrenalin and ergotamine stimulate and paralyse respectively the motor nerve endings of the sympathetic system, (b) pilocarpine and atropine stimulate and paralyse respectively the motor nerve endings of the parasympathetic system and (c) curare paralyse the motor nerve endings of the somatic system of nerves. The intravenous injection of adrenalin does not influence the time relations or the strength of contraction of the *quadriceps extensor* muscle whether evoked directly or reflexly. No increase of tonus was ever observed after adrenalin injections. Injection of ergotamine in quantity which paralyse the motor side of the sympathetic system, produced no change in the rigidity of the muscles of a decerebrate cat nor in the time relations of the contraction of the *quadriceps extensor* muscle produced reflexly. An intravenous injection of atropine had no effect on the muscle tonus of the intact anesthetized cat or on the rigidity of the muscles of the decerebrate cat. A similar absence of effect was observed after the intravenous injection of pilocarpine. The intravenous injection of curare into a decerebrate cat resulted in the immediate disappearance of all rigidity and the production of complete flaccidity of the muscles. This quantity of curare (five milligrammes) does not paralyse the sympathetic system since a typical adrenalin rise of blood pressure may be produced in a completely curarized decerebrate cat under artificial respiration. On Hunter and Royle's hypothesis adrenalin and ergotamine should increase and diminish respectively, the plastic tonus of voluntary muscle. The absence of any demonstrable effect is in direct opposition to their hypothesis that plastic tonus is due to impulses passing to the voluntary muscles through the sympathetic system. The immediate effect of curare in abolishing the rigidity of the muscles of a decerebrate cat when used in a quantity which has no effect on the sympathetic or parasympathetic systems, indicates that this rigidity is due to impulses passing to the voluntary muscles through the somatic system of nerves.

The Purpose of Tetany and Convulsions.

USING a method of injection of gas under the skin and into the abdominal cavity, J. Argyll Campbell (*Journal of Physiology*, July, 1925) has shown that a few minutes' vigorous muscular exercise causes a definite rise of oxygen tension in the tissue spaces—that is in the fluid bathing the walls of the cells. He found that following "Insulin" convulsions there is a similar rise in oxygen tension in the tissues. Tremors and convulsions following thyreo-parathyroidectomy in cats and rabbits increase the oxygen tension in the tissue spaces by as much as 50%. He concludes that tetany and convulsions indicate an attempt on the part of the organism to supply oxygen at a higher tension for the cells; from this may be deduced that the cause of tetany and convulsions is oxygen deficiency in the cells. Oxygen deficiency in the cells may arise either because there is a decrease in oxygen tension in the fluid bathing the cell wall or because the cell—owing to poisoning *et cetera*—cannot "absorb" oxygen. Quinidine definitely lowers the oxygen tension in the tissue spaces before tetany is produced.

"Insulin" and Thyroid Extract.

THE relation of the thyroid gland to carbohydrate metabolism has been the subject of much controversy for some years. On the other hand the diminution of liver glycogen during "Insulin" hypoglycæmia has not yet received a satisfactory explanation. J. H. BURNS AND H. P. MARKS (*Journal*

of Physiology, July, 1925) have endeavoured to clear up both these problems. They have studied: (i.) The effect of cutting the splanchnic nerves on the effect of "Insulin"; (ii.) the relation between the hyperglycæmia produced by adrenalin and the hypoglycæmia produced by "Insulin" in different rabbits; (iii.) the effect on both these reactions of thyroidectomy and thyroïd feeding. The effect of all the evidence is to confirm the view that the liver by liberating sugar from its glycogen store antagonizes the hypoglycæmia produced by excess of "Insulin" in the circulation. This compensating action is weakened by section of the splanchnic nerves or by thyroidectomy; increased by thyroïd feeding so long as the reserve of glycogen persists; annulled when the thyroïd feeding is pushed to the length of exhausting the reserve. The hyperglycæmic reaction to adrenalin varies in different animals as does the hypoglycæmic reaction to "Insulin"; in those animals in which the former is large, the latter is small and vice versa.

The Mechanism of "Insulin" Action.

THE mechanism of "Insulin" action must be considered as twofold: its primary action and its secondary action. The primary action covers only the mechanism of blood sugar reduction while the secondary action is observed in the convulsions which accompany the hypoglycæmia of excessive doses of "Insulin." The secondary action has been much studied but not so the primary action. E. C. MASON AND C. W. MATTHEW (*The Journal of Laboratory and Clinical Medicine*, July, 1925) have endeavoured to determine the rôle of the nerve mechanism in "Insulin" action. Their object has been to stimulate or paralyse portions of the autonomic and central nervous systems and follow such procedures with "Insulin" administration and blood sugar determinations. Unanesthetized animals were used. They found that "Insulin" produces blood sugar lowering after the following procedures: (a) The destruction of the central nervous system; (b) the administration of atropine in doses sufficiently great to paralyse the parasympathetic endings; (c) the administration of nicotine and lobeline in doses which stimulate and paralyse the sympathetic ganglia. "Insulin" apparently acts independently of the central nervous system, the sympathetic nervous system and the parasympathetic nervous system.

Pancreatic Secretion and Secretin.

A SECRETION of pancreatic juice may be evoked by appropriate stimulation of the vagus or by action of secretin. Generally speaking vagal juice is scanty in quantity but rich in proteins and enzymes; secretin juice on the other hand, is copious in quantity but relatively poor in protein and enzymes. J. MELLANBY (*Journal of Physiology*, May, 1925) has studied the relation between these two forms of secretion. He finds that pancreatic juice secreted

after the intravenous injection of secretin contains a constant quantity of sodium bicarbonate but diminishing quantities of trypsinogen, amylase and lipase as secretion proceeds. The diminution of the quantities of enzymes is not due to the exhaustion of the gland, since after long continued secretion the quantities of enzymes may be increased to their original values by vagal stimulation. The hypothesis is put forward that the enzyme content of pancreatic juice is determined by the vagus nerves, whereas the quantity of bicarbonate solution in which these enzymes are contained, is determined by secretin. On this hypothesis secretin may play a subsidiary part in pancreatic digestion, since it only insures the presence in the intestine of an optimal reaction for the activity of the pancreatic enzymes.

BIOLOGICAL CHEMISTRY.

Production of Sulphides.

J. W. McLEOD and J. GORDON (*Biochemical Journal*, July, 1924) have made a study of the production of sulphides by bacteria. All the anaerobes tested give strong nitroprusside reactions for sulphides. Strong positive reactions have been given by cultures of *Bacillus paratyphosus* B, *cholera vibrio*, *Bacillus typhosus*, *Bacillus pyocyaneus* and some strains of *Bacillus coli*. No reaction for sulphides has been given in cultures of staphylococci, streptococci, pneumococci, gonococci, meningococci, *Bacillus influenzae*, *Bacillus paratyphosus* A or of the dysentery bacilli. The authors observed that surface cultures of anaerobic bacilli gave no reaction of sulphides. It thus appeared possible that the nitroprusside reaction occurring in bacterial cultures was due to effective reduction of oxidized glutathione originally present in the medium. The accuracy of this supposition has been tested in two ways. In the first method an attempt was made to remove glutathione with peroxide of hydrogen and then to test the action of bacteria in producing a nitroprusside reaction. Under these conditions no nitroprusside reaction has been obtained with *Bacillus welchii* and *Bacillus paratyphosus* B. In the second method reduction with aluminium mercury couples was carried out in the culture media which were then tested for the nitroprusside reaction. It was found that broth treated with an active couple for one hour yielded a similar reaction to the same broth after the growth of an anaerobic culture. The thermostable substance reacting with nitroprusside detected in bacterial cultures is not produced by the bacteria, but is the oxidized glutathione or some related compound originally present in the broth and reduced by the bacteria in the course of their growth. Bacteria of the types tested do not form glutathione or allied substance reacting with nitroprusside.

Determination of Carbon Monoxide in Blood.

D. G. C. TERVAERT (*Biochemical Journal*, January, 1925) has devised methods for measuring the amount of carbon monoxide in blood. In the methods so far used the gas is extracted from the blood and later its quantity determined except in the method of Haldane which is colorimetric and that of Hartridge which is spectroscopic. The methods in use have not been satisfactory when the amount of carbon monoxide in the blood is less than 10% of its total capacity. The author has endeavoured to improve the accuracy of the determination of small quantities of carbon monoxide and also the extraction of carbon monoxide from blood. For the estimation he has used the capillary pipette of Jordan and Schwartz and measured minute quantities of carbon monoxide into a litre flask. By a special apparatus he has determined the carbon monoxide from liberated iodine. A sketch of the apparatus is given. Very satisfactory results are obtained for low percentages of carbon monoxide. By a modification of the use of potassium ferrocyanide the carbon monoxide is liberated from the blood. Suitable apparatus to permit of the immediate analysis of the liberated gas is described.

Metabolism of Proteins.

T. N. SETH and J. M. LUCK (*Biochemical Journal*, April, 1925) have made experiments upon rabbits in which they determined in the blood the nitrogen as urea and the nitrogen as amino-groups after the administration of glycine, leucine, aspartic acid, glutamic acid, histidine and tryptophane. These experiments have been made to elucidate the manner in which the specific dynamic action of proteins is brought about and especially whether this is due to the chemical stimulation of the body cells by some intermediary metabolite of the amino acids other than the immediate products of their deamination. These experiments indicated that there is no great difference in the extent of urea formation in the case of glycine, alanine, aspartic acid and glutamic acid, but a progressive decrease in the case of cystine, tryptophane, leucine and histidine. On the other hand the amino acid content of the blood attains a high maximum maintained for seven hours, after the administration of glycine, alanine or histidine while the amino acid content of the blood rises only a little and returns soon to normal with the other amino acids investigated. Further experiments have been carried out upon dogs in which samples of blood have been taken from the femoral artery and vein and from the portal vein. The amino acids have been given in the same amounts as in the experiments upon rabbits. The results obtained are similar to those observed upon rabbits. From the figures obtained with venous blood the authors conclude that there is a rapid absorp-

tion of amino acids from the blood into the tissue. When glycine, alanine and aspartic acid have been given by intravenous injection to dogs the amino acid content falls rapidly, while the urea content is unchanged for two hours. The authors conclude that the amino acids are absorbed into the tissues with great rapidity, while the urea formation follows later. From these results the authors conclude that the specific dynamic action of an amino acid is proportional to its capacity to increase the amino nitrogen content of the blood.

Avian Deficiency Disease.

T. OGATA, S. KAWAKITA, S. SUZUKI, AND S. KAGUSHIMA (*Mitteilungen aus der Medizinischen Fakultät der Kaiserlichen Universität zu Tokyo*, Band XXXII., Heft 3, March 31, 1925) in an article printed in Esperanto state that they found that the dried and powdered liver substance of healthy fowls was highly efficacious in curing the disease produced in pigeons by a dietary of polished rice, casein salts and water. It appeared to be as efficacious as the same quantity of rice bran. This was taken to prove that the liver substance of such fowls was rich in vitamin B. On the other hand, the powdered liver substance of fowls fed on the polished rice dietary (deficient only in vitamin B) was found to have very little or no curative effect on the polyneuritic pigeons. They then tested the curative effect of feeding dried powdered human liver substance to polyneuritic pigeons. In one group the liver substance was taken from the bodies of patients who had died of beri beri. In a second group, used for control purposes, the material was taken from the bodies of patients who had died of other diseases, not from beri beri. The first group contained material from fourteen cases. The second contained material from fifteen cases. The liver powder from the bodies of beri beri patients proved to have very efficient curative power for polyneuritic pigeons in eight of the fourteen cases, but was less in the rest. The powder from the fifteen controls was very efficient in six, but less efficient in the remaining ten. The authors considered that this showed that the body was not denuded of vitamin B in beri beri, as it was in the polished rice disease of pigeons. They regarded it as proved that beri beri was not the same disease as that caused by deficiency of vitamin B.

Reproduction of Colpidium.

D. W. CUTLER and L. M. CRUMP have made some further experiments in respect to the existence of allelocatalysis in cultures of *Colpidium colpoda* (*Biochemical Journal*, April, 1925). They have failed to observe any evidence of allelocatalysis in cultures of either washed or unwashed individuals. They have repeated their experiments formerly reported with washed individuals. They conclude that washing the animals has no deleterious effect upon them nor does it retard the reproductive rate.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE NEW SOUTH WALES BRANCH was held at the B.M.A. Building, 30-34, Elizabeth Street, Sydney, on April 30, 1925, Dr. R. B. WADE, the President, in the chair.

Industrial Hygiene.

PROFESSOR H. G. CHAPMAN read a paper entitled: "The Practice of Industrial Hygiene" (see page 387).

DR. S. A. SMITH read a paper entitled: "Lead Absorption in its Industrial Aspect" (see page 391).

DR. J. S. PURDY congratulated the two speakers and stated that he had enjoyed a real intellectual treat. Fourteen years previously in a sectional presidential address at the Australasian Medical Congress in Sydney, he had had the temerity to venture into the field of industrial hygiene and had pointed out that the first Chief Inspector of Factories in England was a medical man, that his two assistants were medical men and that the Chief Inspector of Factories in England had always been a medical man. In Australia, however, it was exceptional for a medical man to be in charge of factory administration. The only exceptions had been in Tasmania when the *Factory Act* had first been introduced and until recently in Western Australia.

His experience did not coincide with that of Professor Chapman in regard to the attitude of the employee towards the application of the principles of industrial hygiene. He had found some difficulty in inducing employees to appreciate arrangements made for their own welfare. At the Zeehan Smelting Works in Tasmania and in the mines he had found that at first the employees had even resented and in some cases actually abused the facilities for bathing and otherwise adding to their comfort. Ruskin had stated, that "any interference which tends to reform and protect the health of the masses is too often viewed as unwarranted interference with their vested rights to inevitable disease and death."

Professor Chapman with his characteristic modesty had not related the whole story of the effect of the work of the Technical Commission of Inquiry at Broken Hill. In August, 1924, he had spent four hours underground in the North Broken Hill mine and with a knowledge of the conditions of mines in England, New Zealand, Tasmania, the Transvaal and Natal he could say that he had not seen anything to compare with the excellent arrangements as to hygiene and efficient ventilation with those in the North Broken Hill mine. As a result of the work of the Commission not only had the environment been greatly improved and the conditions at work rendered safe, but the output had actually been increased although the hours of work per shift had been decreased. It was true that employers frequently regarded industrial hygiene as a mere fad. The results at Broken Hill, those in the Witwatersrand mines in the Transvaal and in some of the large factories in the United States of America and even in Australia, as in Sydney where welfare work had been introduced, had proved to employers the enormous advantage which followed the introduction of modern methods. Anyone who had read "The Life and Work of Henry Ford," would realize what the application of industrial hygiene meant to industry. He thought that it was a pity that the ban of the British Medical Association could not be removed to allow Professor Chapman and Dr. S. A. Smith to tell their story for instance to the Chamber of Manufactures or the Chamber of Commerce or indeed to the whole world as they would be able to show that it paid the employer to introduce the reasonably hygienic conditions of work.

In regard to lead poisoning he pointed out that though there were three thousand workers employed by the City

Council of Sydney of which a minority was exposed to lead, they had been extremely fortunate in having had few cases of actual lead poisoning. He had examined a man recently who had been a painter but for the previous thirteen years had not done any painting until he picked up the work again. After three weeks he had become ill and at the Sydney Hospital a diagnosis of lead poisoning had been made. On inquiry Dr. Purdy had found that this man had been painting the ceilings of the City Health Department and probably swallowed some of the white lead paint as it fell in small droplets from the ceiling as the man was in the habit of painting with his mouth open. He was satisfied that the constant control of the health of the workers of the City Council had kept down the sickness rate. Although the conditions in the City Council were ideal in so far as that after twelve months' service every man was paid for three months' full wages during illness and some men who drew sick pay from friendly societies, actually earned more during illness than while they were well. The sickness rate *per caput* was actually only seven days a year. Although this was not unsatisfactory, he hoped to see it reduced to an even lower figure. He recognized, however, that there was a strong temptation for a man to stay in bed when he could earn more money than while he was at work.

DR. JOHN MACPHERSON agreed with Dr. Purdy that they had had an intellectual treat. The subject dealt with by the two speakers interested him and he regarded plumbism as especially important. He maintained that it could not be too often insisted upon that the so-called lead line was not evidence of lead poisoning but merely of lead absorption. He maintained that the judiciary and the public must be educated to understand this fact. In regard to other manifestations of lead poisoning there appeared to have been a change of opinion of the medical profession. It was largely held at present that lead colic was not evidence of lead poisoning; it was caused by the turpentine contained in lead paints. In a similar manner many authorities claimed that the punctate basophilia encountered in connexion with lead poisoning was due to turpentine vapour. The fact that very few of the workers at Broken Hill manifested basophilia supported this view.

Accurate information in regard to lead poisoning was of importance in connexion with claims made under the *Workmen's Compensation Act*. He referred to the case of a gardener who had employed arsenate of lead for the spraying of plants. This man had become ill with diarrhoea and other symptoms and his doctor had certified that he was suffering from lead poisoning arising out of and in the course of his employment. The man had been referred to Dr. MacPherson. He had found that the urine supplied contained lead, but no arsenic. The sample had been brought with the patient. In view of this finding Dr. MacPherson had required the man to visit him again and to pass urine in his presence. The patient again brought a sample of urine, which Dr. MacPherson subsequently found contained lead and no arsenic. After much persuasion he prevailed upon the man to pass urine. This fluid contained neither lead nor arsenic. Naturally no compensation had been paid and the man had been informed that if he pressed his claim he would be required to give an acceptable explanation of the presence of lead without arsenic in the two samples submitted by him. There were other difficulties in connexion with compensation claims. It was a curious fact that muscular rheumatism and lumbago had vanished from the schedule of disorders in these claims and that the pains were then attributed to a particular and definite strain in lifting. Malingering was a very real difficulty in these cases.

In regard to the treatment of lead poisoning he held that, if lead were stored in the tissues, it was probably better to leave it there. He referred to the history of a man who had worked in lead for many years and had suffered from symptoms of plumbism. He had absorbed and stored up a considerable quantity of the metal. Seven years after the last exposure to lead an aneurysm had been detected and the man had been treated with potassium iodide. This had had the effect of mobilizing the stored up lead; the man had died of lead poisoning within a few weeks.

DR. C. BADHAM stated that he had been a keen student of the work of the Broken Hill Technical Commission of

¹ Dr. Purdy appears to be under some misunderstanding. The British Medical Association has no regulation forbidding members from lecturing on hygienic or professional matters to lay audiences. The New South Wales Branch has adopted a rule requiring members to obtain the sanction of the Branch Council for the delivery of lectures of this nature.

Inquiry. There were many points on which he sought information; as the final report had not appeared he sought this information in vain. He thought that the final report should have been published without the long delay and expressed the hope that Professor Chapman and Dr. S. A. Smith would publish it in the near future.

Dr. Badham dealt with the causation of pneumoconiosis arising in the workers in certain basalt quarries in New South Wales.

The amount of free silica in the dust at Broken Hill appeared to him to be too low in some mines to be of causative importance. He wanted to know if any effort had been made by the workers of the Technical Commission to assign the pneumoconiosis to any element. He thought that the fact that he had found the first stage of pneumoconiosis in a man who had only worked in the dust of an orthoclase basalt (a feldspathic rock containing no free silica) might be of service in this connexion. He handed round a skiagram showing the early changes of pulmonary fibrosis; the patient had been a worker twenty-five years in a crushing plant at Kiama. He had not been able to discover from the literature much information concerning the degree of lung changes caused by feldspathic ore; apart from the work done at the Bon Accord quarry in South Africa there were only details of animal experiments.

The Broken Hill workers had been very reticent concerning the dust conditions to which miners were exposed during work. He was glad to note that Dr. S. A. Smith had that evening made a statement concerning the amount of dust to which a miner at Broken Hill had in former times been exposed. When working in the potteries he had also turned to the Technical Commission reports for information, but in their unfinished state they had not helped him as he had expected they would. It was no mere fanciful thing to look on the Broken Hill mines as similar to large potteries in which in the early days the work had been conducted with a soluble glaze (lead carbonate) and in the later days with a low solubility glaze (lead sulphide galena) and on account of this analogy it would be useful to know what pathological changes the different years had produced.

In their first report the Technical Commission of Inquiry had announced that "numbers of mine workers show signs of cardio-vascular and other diseases which may be the result of poisoning by lead." In the evidence given before the Board of Trade Inquiry it was stated that there was an undoubted nephritic type of lead poisoning in the Broken Hill workers, but in the last report the authors were singularly mute in regard to the relation of arterio-sclerosis and lead poisoning. He twitted the authors for having been sufficiently astute in the avoidance of an expression of definite opinions in the last report so that they could change their views should they hold this to be advisable. He found the figures which Dr. S. A. Smith had given concerning the incidence of arterio-sclerosis and lead poisoning, were particularly interesting. It was unfortunate, however, that the conclusions drawn from these figures would have to go back to the melting pot. Minot had shown definitely that when lead was taken into the body, it was chiefly stored up in the skeletal tissue and that very little was excreted, any mobilization of this skeletal store of lead could do much harm.

He pleaded that the data obtained by the Broken Hill Commission of Inquiry, which had cost the State no small sum, should be given in a final report and not piecemeal. In conclusion Dr. Badham congratulated Dr. S. A. Smith on his attempt to elucidate a subject which had given them so much concern.

Dr. W. N. HORSFALL added his tribute to the readers of the two papers. He stated that while at sea he had noticed that the speed of ships was invariably reduced in the middle watch, that from midnight to four o'clock. The firemen belonging to this watch worked from noon till four o'clock in the afternoon as well. This reduction in speed could be put down to the fact that the men had broken periods of sleep in the twenty-four hours. They slept from five till eight o'clock in the morning and again from eight till half past eleven o'clock at night. Their periods of sleep

were broken at meal hours. They did not have as good a midday meal as the other men.

Industrial hygiene had for its objects the maintenance of the working man, thereby increasing his efficiency. He referred to the conditions he had watched in a cigarette factory in Mexico. He had noticed that in each room there was a man perched on a platform reading stories aloud to the workers. He had been told that unless the attention of the workers was arrested by a story or some similar means, they were inclined to gossip and to neglect their work. Under modern conditions it was impossible for the workmen to take a real interest in the work. Formerly a bootmaker would make a boot and feel proud of the completed article. To-day a bootmaker was not allowed to do more than put eyelets into the uppers. It was impossible to be interested in such an occupation and he became discontented. Men doing muscular work required more calories than when doing mental work. Everyone, however, would admit that brain work did produce fatigue, did not involve a greater output of carbon dioxide. He was satisfied that the mental interest of work was very important. Fatigue was not produced so readily when the worker had a great interest in the work he was doing.

Dr. ROBERT DICK thanked the readers of both papers for their clear expositions. He wished to ask a few questions. In regard to lead poisoning at Broken Hill, he would like to know if anything had been done to ascertain how far the lead had affected the general population and how far it had affected the women and children living in the immediate neighbourhood of the mines. He assumed that the dust would be blown a considerable distance from the sheds and that it might be present in sufficient concentration in the neighbourhood to produce a deleterious effect. It would be interesting to know whether abortion was more common among the women at Broken Hill than elsewhere. Similarly he asked whether any attention had been paid to the cancer incidence rate. It had been stated that treatment with lead salts was of use in cancer.

Dr. A. H. MOSELEY, D.S.O., spoke of his experience in industrial hygiene at the General Post Office, Sydney. He did not think that there was much malingering among the employees. No doubt many men and women thought that they were much worse than they really were when they had minor ailments. There was a considerable number of nervous complaints. Almost every woman stated that there was something the matter with her nerves. Unfortunately, the family doctor was very sympathetic and this increased the nervous instability. He was convinced that the real fault lay in the fact that the women unlike the men paid far too little attention to their food. They often came to work after having had little or no breakfast. They subsisted on too little and unsuitable food and nearly all of them were constipated. He was speaking chiefly of the girls who lived in lodgings. He was satisfied that the conditions of their home life should be improved and advocated the establishment of good hostels for women workers as the real foundation of improvement in their health.

Dr. R. B. WADE expressed in the name of the Branch their indebtedness to Professor Chapman and to Dr. S. A. Smith for their highly interesting and instructive papers. The subject of industrial hygiene and preventive medicine was one that the medical profession would be required to study more carefully in the future. At the present time industrial hygiene was more concerned with legal squabbles and with claims for compensation than with the improvement and maintenance of the health of the worker. He thought that it was deplorable that medical practitioners went into the witness box and gave evidence which was often directly contradictory to the evidence given by the medical witnesses called by the other side. Medical evidence should be restricted to scientific facts and he thoroughly approved of previous consultation between the practitioners who were about to give evidence. Medical evidence should be judicial, not partisan.

PROFESSOR H. G. CHAPMAN thanked the members for the manner in which they received the papers and for their kindly criticism. In reply to Dr. Dick he stated that they had tried to measure the lead in the open air. None had been found even a few yards away from the working places.

It was very doubtful whether those living in the neighbouring houses absorbed any lead. A person needed to inhale about one milligramme of lead daily before any effect could be produced. Their examination had been limited to the mine workers and had not been extended to women and children or to the general community.

He hoped that some day they would be able to publish the full report. He would very much like to determine the amount of dust that gave rise to pulmonary changes. There was very little evidence to enable them to estimate the amount of silicious or other dusts that produced fibrotic changes in the lungs. He admitted that there was no real evidence on which to base a discussion on the aetiology of pneumoconiosis occurring at Broken Hill.

In the course of a brief reply Dr. S. A. SMITH also expressed the hope that the final report of the Technical Commission of Inquiry would soon be published. Professor Chapman had been generous to him in not laying the blame on his, the speaker's, shoulders. He certainly would make an effort to get on with the work since he had learnt of the impatient anxiety of Dr. Badham. He could visualize Dr. Badham awaiting the report with sharpened teeth, breathing fire.

Medical Societies.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING OF THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA was held at the Adelaide University on May 1, 1925.

Lobar Pneumonia.

PROFESSOR J. B. CLELAND raised the question of the aetiology of lobar pneumonia. The way in which the disease often picked out one whole lobe, leaving all other portions of the lungs unaffected, was remarkable amongst bacterial diseases. Great difficulty had been experienced in reproducing the disease in animals, but recently by intratracheal inoculations of pneumococci a similar pathological condition was said to have been produced in monkeys. Recently Professor Cleland had been much impressed by the statement made by Osler and generally accepted as true, that the crisis of the disease tended to occur on odd days. Such a prevalence of odd days over even ones could not readily be explained on bacteriological grounds. Periodicity, however, occurred amongst protozoan organisms and perhaps amongst filter-passers. He thought it quite possible that there was some other living entity besides the pneumococcus responsible for the condition and that what occurred in the affected lobe of the lung might be likened to what happened in the nose at the commencement of an infectious cold in the head, now known to be due to a filter-passer. Such a filter-passer multiplying in one portion of one lobe of the lung might lead to such an outpouring of fluid that nearly the whole lobe became consolidated. Later pneumococci might gain entrance, flourish in the exudate and be responsible for many of the later phenomena.

A MEETING OF THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA was held at the University of Adelaide on July 3, 1925.

Antigens.

DR. L. V. BULL stated that for some years cholesterol has been added to the alcoholic extract of heart muscle for the purpose of providing an antigen in the Wassermann test. More recently the alcoholic extract had been made of the acetone insoluble constituent of the heart muscle and cholesterol added in known amount. The cholesterol so used was held in suspension by the acetone insoluble constituents when the whole was diluted by normal saline solution. The suspension was unstable, particularly in the

presence of syphilitic sera. Through the courtesy of Professor Robertson he had been able to examine a stable emulsion of pure cholesterol in order to determine whether it could act by itself as an antigen in the Wassermann test. He found that cholesterol possessed no specific antigenic properties when used in this way. These observations confirmed the opinion held by most workers that cholesterol acted merely as an intensifier of the action on complement produced by the interaction of the acetone insoluble lipoids and the Wassermann substance in the serum of syphilitics.

In an attempt to find a suitable antigen for use in the hydatid complement fixation test certain observations had been made on the behaviour of hydatid fluid which had been (i.) dried and (ii.) preserved with chloroform. He had found that hydatid fluid dried by means of a forced draught at a temperature of from 15° C. to 50° C., did not lose its antigenic property, but acted in exactly the same way and the same titre as the untreated fluid. An occasional fluid, however, might show considerable loss of antigenic power when so treated. A dried fluid when kept in a desiccator retained its antigenic property for some considerable time. The majority of samples of hydatid fluid collected from cysts in sheep showed a very definite intensifying action on the hæmolytic property of complement. This tended to counteract the antigenic property of the fluid and it had been found that the dried fluid still retained this property. It was found that hydatid fluid preserved by adding 1% of chloroform and aerated before use to remove the chloroform, lost this intensifying action on complement and became considerably stronger in antigenic property. It had been found, moreover, that aeration without the introduction of chloroform and also removal of chloroform by hydrogen produced the same improvement of hydatid fluid as an antigen. What actually happened in the fluid so treated was at present unknown, but the reaction of the fluid became more alkaline. Hydatid fluid treated with 1% of chloroform and kept in sealed ampoules retained its antigenic property for some time.

DR. A. A. LENDON inquired as to what might be attributed to the urticaria and toxic action produced by absorption of hydatid fluid.

DR. BULL stated that they were considered to be due to anaphylaxis.

Helminths and Neoplasms.

PROFESSOR J. B. CLELAND pointed out that certain helminthic parasites, the *Spiroptera*, caused malignant neoplasms in rats, while sarcomata were sometimes found in association with *Cysticercus fasciolaris* infections in rats. There appeared to be no record of such neoplasms in the neighbourhood of hydatid cysts, although by analogy one might expect them to occur.

DR. L. V. BULL pointed out that this might be explained by the fact that, so far as known, no other animal but the rat developed malignant disease in response to helminthic parasites. Most horses were infected with *Habronema* in the stomach and yet no malignant disease arising from this source had been recorded. The development of neoplasms in response to helminthic infection seemed to be a peculiarity of the rat.

Post Mortem Examinations.

PROFESSOR J. B. CLELAND read an abstract of some of the results arising out of an analysis of the causes of death and lesions found in one thousand *post mortem* examinations conducted at the Adelaide Hospital. The details of these would later be communicated elsewhere.

Shaking Electrode.

MR. R. H. MARSTON exhibited a Clark shaking electrode designed for the determination of the hydrogen ion concentration in fluids containing dissolved bicarbonates.

THE SYDNEY HOSPITAL CLINICAL SOCIETY.

A MEETING OF THE SYDNEY HOSPITAL CLINICAL SOCIETY was held in the Matland Lecture Theatre, Sydney Hospital, on April 23, 1925, Dr. T. FRASCHI, D.S.O., in the chair.

Bowen's Precancerous Epithelioma.

DR. GEORGE R. HAMILTON showed a patient, aged thirty-nine years, who complained of a sore on the right arm of three years' duration. The lesion had been excised about three years previously and it had recurred within a few weeks of excision. The patient also complained of several sores on the back of more recent onset. On examination it was seen that an ulcer was present on the outer aspect of the right arm. It was larger than a shilling and its edges were raised. It was surrounded by an area of erythema. The condition had the appearance of an epithelioma and it was reported that a diagnosis of basal celled epithelioma had been made by the pathologist who examined the original lesion after its excision. Excision had been wide and had been carried down to the level of the muscles. The lesions on the back very closely simulated rodent ulcers. They varied in size from 0.5 to 2 centimetres in diameter. They were circular and had raised scaly edges. Dr. Hamilton said that he regarded these lesions as Bowen's precancerous epithelioma. It was evident that they would be liable to undergo the same change as had been noticed in the arm lesion. The lesion of the arm had originally had an appearance similar to that of the lesions on the back.

Excision of part of the growths on the arm and on the back was advised for the purpose of pathological examination. The Bowen type of cancer was more vascular than rodent ulcer, but was otherwise indistinguishable from it. Dr. Hamilton considered that radium would give good results in treatment.

Other speakers did not consider that radium would be of much use. The lesions were said to recur after the use of radium.

Coxa Vara.

DR. R. H. BRIDGE showed a girl, aged fourteen years, who was said to have had difficulty in walking for seven months owing to stiffness of the left hip. The girl was unable to speak English and for this reason it was difficult to obtain a detailed history. On examination it was seen that the patient walked with a limp and that she dropped the left shoulder. The left buttock was smaller than the right and there was definite wasting of the left inferior extremity with 1.25 centimetre (half an inch) of shortening. There was limitation of abduction and internal rotation at the left hip joint. Radiological examination revealed the presence of *coxa vara*. The causes suggested for the disease were Perthes's disease, displacement of the head of the femur, rickets and trauma. Cuneiform osteotomy was advised for treatment.

Dr. Bridge also showed a boy of eight years who was reported to have fallen down and to have hurt his right leg three months previously. On examination it was seen that the boy walked with a limp. There was definite wasting of the right buttock and right thigh and the same limitation of movement as had been seen in the previous patient. X ray examination revealed bending and shortening of the neck of the right femur. It was suggested that a Thomas's walking calliper should be applied to the right leg and that the boy should be given the benefit of country air and good food.

Hirschsprung's Disease.

DR. J. MACDONALD GILL reported the clinical history of a boy, aged two years and eleven months, who had suffered from general enlargement of the abdomen. The history was typical of Hirschsprung's disease or congenital dilatation of the colon. Dr. Gill said that all patients suffering from this disease who had been seen by him, had died, whether they had been subjected to medical or surgical treatment.

The treatment was discussed and opinion was divided as to the necessity for medical or surgical treatment. It was agreed that in the absence of serious or acute symptoms surgery was inadvisable. Excision of the colon had been tried without success. It was said that in one instance an anastomosis between the ileum and the pelvic colon had been followed by dilatation of the small bowel.

Dr. Gill considered that the disease was due to a congenital abnormality of the bowel. Reference was made to patients suffering from this condition who had attained the ages of fourteen and thirty years respectively without the onset of acute symptoms. This was contrary to the usual experience that the patients died at a very early age.

Rodent Ulcer.

DR. LANGLOH JOHNSTON showed a male patient, aged forty-nine years, who had been treated by radium seven years previously for a deeply penetrating rodent ulcer of the right side of the nose at its junction with the right eyebrow. Rodent ulcers in this position were particularly difficult to cure as they were very liable to recur unless a very wide area was allowed at the time of surgical removal. Dr. Johnston pointed out that the scar was supple and the cosmetic result excellent. Only two applications of radium had been made.

Urticaria Pigmentosa.

Dr. Johnston also showed a girl, aged twelve years, who had suffered for two years from *urticaria pigmentosa*. The lesion had started with wheals like an ordinary urticaria, but instead of disappearing the lesions had persisted for some weeks and after a variable period had been characterized by a deposit of pigment of a bluish colour. Dr. Johnston said that if the sites of the stains of disappearing lesions were rubbed, wheals would appear. Some of the lesions were macular and others were distinctly nodular. As a rule the eruption was most abundantly seen in the covered regions of the body. In the patient before the meeting the eruption was most prominent on the face and hands. The disease generally continued for years, itching was usually present to a considerable extent and the general health was unaffected. On microscopical examination the wheal was found to be composed of mast cells. It was said that in some instances acid fruits would decalcify the blood and in such cases the urticaria was supposed to be due to the deficiency of calcium. Calcium lactate in doses of 1.8 gramme (thirty grains) three times a day sometimes gave good results.

Fractures of the Lower Extremity.

DR. GEORGE BELL, O.B.E., showed a male patient, aged fifty-seven years, who had sustained a fracture of both bones of the left leg in the lower third by being run over by a water cart. Progress had been uneventful for fifteen days and then the whole of the left lower limb had become greatly swollen and oedematous as a result of thrombosis.

Dr. Bell also showed a male patient, aged fifty-four years, who had been admitted to Sydney Hospital after he had been treated for eight weeks in a country hospital. On admission a large sore had been present behind the knee as well as in the neighbourhood of the heel and the ankle. Dr. Bell asked for suggestions as to the best method of treatment. He explained that shortening of 7.5 centimetres was present. A fracture of the lower third of the femur was visible on a skiagram. Considerable overlapping and early callus could be seen. The distal fragment was displaced outwards and backwards. A fracture of the lower third of the right fibula and of the internal malleolus had also been found on X ray examination. No union was present and necrosis of the fractured ends of the bone with sequestrum formation could be seen.

Congress Notes.**AUSTRALASIAN MEDICAL CONGRESS (BRITISH MEDICAL ASSOCIATION).**

THE PRESIDENT OF THE SECOND SESSION OF THE AUSTRALASIAN MEDICAL CONGRESS (BRITISH MEDICAL ASSOCIATION), DUNEDIN, 1927, DR. L. E. BARNETT, is about to pay a visit to England. He expects to visit Australian ports *en route*, arriving in Sydney about October 17, 1925. He wishes us to announce that he hopes to meet as many officers and others interested in the session as possible.

The Honorary General Secretary requests those invited to act as office-bearers of the several Sections to reply to the invitations as soon as possible. A revised list will be published when all the replies have been received.

The Sections.

Dr. C. H. Mollison has intimated that he will be unable to act as President of the Section of Pathology and Bacteriology. The Executive Committee has invited Dr. A. H. Tebbutt, D.S.O., to accept the position.

The Executive Committee has passed a resolution of regret at the death of Roy Charles Merryweather, who had been elected a Vice-President of the Section of Medicine.

The Executive Committee has asked us to advise all who are interested in the session of Congress to read the information given in this column. It may be impossible to convey this information individually to members of the medical profession in Australasia.

Correspondence.

ESSAY ON MATERNAL MORBIDITY AND MORTALITY.

SIR: I have just read with the greatest interest Dr. Morris's prize essay on "The Causes and Prevention of Maternal Morbidity and Mortality." There is, however, a question I would like to ask Dr. Morris with regard to the figures contained in Table VI.—Puerperal Mortality in New South Wales Arranged according to Various Districts and the remarks on page 307 and the conclusion (No. 4) which he has arrived at as a result of this discussion.

In discussing this question it must be taken into account that the larger centres on account of "the extra facilities for care and treatment available" must necessarily attract from other parts a disproportionate number of patients who give indications of or have actually developed causes of maternal morbidity and mortality. Thus the figures for the larger centres are loaded with an excess of difficult and dangerous cases. This disproportion has no doubt increased and will continue to increase with the more general and efficient practice of antenatal care by the profession and the increasing numbers of women who are willing to present themselves for examination. Quite recently a practitioner in a distant country district as a result of an opinion formed during his antenatal care actually paid the fare of a patient to Sydney so that she might have the advantages which the city can offer and when informed of the history of the case after it left his hands considered himself much to be congratulated on the results of his prognosis.

In view of this consideration I would like to ask Dr. Morris if he has taken any measures to correct these figures for this loading. Having gone into this matter previously, I came to the conclusion that it is quite impossible to make any such correction or to compare accurately the maternal mortality rates of the larger centres with those of other parts. To form any helpful conclusion what must be known is how many of these mothers who died happened to be in Sydney because of "the extra facilities available," not how many mothers died in Sydney "in spite of" these same advantages and such important information is not now available nor is likely to become so under the present arrangements for collecting statistics nor until the profession agrees to furnish a detailed notification of every pregnancy and birth and the Health Authorities compel the Governments to assist them by providing the money and the necessary legislative enactments to make such a system effective. All the figures available under the present system are far too vague and indefinite to enable us to get at the root of the matter and without a detailed knowledge of all births in the Commonwealth we are not likely to progress far along these lines.

Yours, etc.,

A. M. DAVIDSON, O.B.E., M.B., Ch.M.,

Honorary Anaesthetist, Marrickville District Hospital.
Enmore, New South Wales.

September 12, 1925.

SIR: It has been pointed out to me that reference No. 40 in my essay is incorrect. Instead of quoting my source of information as: "The Report of the Royal Hospital for Women, Paddington, 1922," I should have given it as: "H. A. Ridler: 'An Outdoor Antenatal Clinic.' THE MEDICAL JOURNAL OF AUSTRALIA, October 18, 1924." In the hurry of the final compilation of so many scattered facts I apparently inadvertently mistook my reference. I therefore apologise to Dr. Ridler, whose article contains much valuable information derived from the prematernity and other departments of the hospital.

Yours, etc.,

Sydney,

September 14, 1925.

E. SYDNEY MORRIS.

THE INTERNAL ADMINISTRATION OF IODINE.

SIR: The administration of iodine internally in the form of a spirituous solution is quite common today. But the manner in which this is prescribed does not insure that the patient always receives the same dose.

It is variously prescribed as *tinctura iodi* (French Codex), *tinctura iodi* potassium free and *tinctura iodi* (French Codex) potassium free. As the strength of the Codex tincture was altered in 1922 from ten grammes in ninety grammes of alcohol 95% to ten grammes of iodine with four of potassium iodide and alcohol (90%) 136 grammes, this represents a big reduction in the strength of the iodine and this reduction is not compensated for by the addition of the potassium iodide.

Owing to the alterations in the official titles to *tinctura iodi mitius et fortis* and also to the variation in strength of the official French tincture from both of these, the prescriber who specifies *tinctura iodi* potassium free, places the dispenser in rather an invidious position. The latter may exercise his discretion as to the strength of the tincture dispensed, but without any feeling of confidence that he has definitely fulfilled the prescriber's intentions and therefore without any satisfaction to himself.

And the position is a little bit complicated by the new vogue of prescribing the old Lugol's aqueous solution which contains potassium iodide and twice the weight of free iodine in the *tinctura iodi mitius*.

As dispensing pharmacists we suggest that anomalies like this are better remedied than ignored and we trust that you will commend this to your readers.

Yours etc.,

HENRY FRANCIS & CO.

Melbourne,

September 16, 1925.

Naval and Military.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Numbers 47, 49, 54, 60 and 62, of June 11, 25, July 9, 30, August 6, 1925.

AUSTRALIAN MILITARY FORCES.

First Military District.

Australian Army Medical Corps.

The provisional ranks of Captain F. W. R. Lukin and Lieutenant P. N. Macgregor are confirmed.

Australian Army Medical Corps Reserve.

Honorary Captains F. Challands and O. E. J. Murphy are transferred from the Australian Army Medical Corps Reserve, 2nd Military District, 1st June, 1925. Major E. L. Luther and Captain G. V. White are placed upon the Retired List, with permission to retain their ranks and wear the prescribed uniform, 1st June, 1925.

Honorary Captain A. A. Parry is retired under the provisions of Australian Military Regulations 152 (1), 29th June, 1925.

To be *Honorary Captain*—Herbert Leopold Ashton-Shorter, 1st July, 1925

Unattached List.

Major S. F. McDonald is transferred to the Reserve of Officers, 1st June, 1925.

Second Military District.

Australian Army Medical Corps.

The provisional rank of Lieutenant granted to N. H. Meacle is terminated, 30th June, 1925.

To be *Captain (provisionally)*—Norman Harding Meacle, 1st July, 1925.

Major (Honorary Lieutenant-Colonel) C. W. Thompson, D.S.O., M.C., is transferred from the Unattached List, 1st July, 1925.

Australian Army Medical Corps Reserve.

Honorary Captains F. Challands and O. E. J. Murphy are transferred to the Australian Army Medical Corps Reserve, 1st Military District, 1st June, 1925.

Honorary Captain W. A. L. H. Henderson is transferred from the Australian Army Medical Corps Reserve, 3rd Military District, 10th June, 1925.

Honorary Captain J. O'Flynn is transferred to the Australian Army Medical Corps Reserve, 5th Military District, 1st July, 1925.

The undermentioned officer is retired under the provisions of Australian Military Regulation 159 (2), 1st June, 1925: Honorary Captain T. A. Palmer-Benbow.

Honorary Captain E. W. Fitzpatrick is retired under the provisions of Australian Military Regulation 159 (2), 1st July, 1925.

Third Military District.

Australian Army Medical Corps.

The provisional appointments of Captain W. L. Armstrong and Lieutenant H. F. Summons are terminated under the provisions of Section 15 of the *Defence Act*, 31st May, 1925, and 9th March, 1925, respectively.

To be *Captain (provisionally)*—Honorary Captain W. L. Armstrong, from the Australian Army Medical Corps Reserve, 1st June, 1925.

To be *Lieutenant (provisionally)*—Hedley Frank Summons, 10th March, 1925.

The provisional appointment of Captain F. K. Norris is terminated under the provisions of Section 15 of the *Defence Act*, 31st December, 1924.

To be *Captain (provisionally)*—Honorary Captain F. K. Norris, from the A.A.M.C. Reserve, 1st January, 1925; the provisional rank of Captain F. K. Norris is confirmed; Captain (provisionally) V. R. Delany is transferred to the Australian Army Medical Corps Reserve, 4th Military District, and to be Honorary Captain, 10th February, 1925.

The provisional rank of Lieutenant granted to G. A. Penington, G. Simpson and H. F. Summons is terminated, 30th June, 1925.

To be *Captains (provisionally)*—Geoffrey Alfred Penington, George Simpson and Hedley Frank Summons, 1st July, 1925.

The provisional rank of Captain R. Hylton is confirmed. The regimental seniority of Captain F. K. Norris is next after Captain H. L. Stokes.

Major J. C. Campbell, D.S.O., and Captain E. I. Littlejohn are transferred to the Australian Army Medical Corps Reserve, 1st July, 1925.

Australian Army Medical Corps Reserve.

Honorary Captain W. A. L. H. Henderson is transferred to the Australian Army Medical Corps Reserve, 2nd Military District, 10th June, 1925.

Honorary Captains A. E. Stenning and L. G. Male are transferred to the Australian Army Medical Corps Reserve, 5th Military District, 10th June, 1925.

Honorary Major W. R. Boyd is retired under the provisions of Australian Military Regulation 152 (1), 24th June, 1925.

To be *Honorary Captain*—Hugh Glasson Mitchell, 1st July 1925.

Honorary Captains C. H. Martin and N. M. Simpson are transferred to the Australian Army Medical Corps Reserve, 6th Military District, 1st July, 1925.

Honorary Captains H. W. J. Cook, K. Maxwell, G. O. Rigby, T. W. Brown and E. S. Fischer are retired under the provisions of Australian Military Regulation 159 (2), 30th June, 1925.

The notification respecting the grant of the honorary rank of Captain to Alfred Ernest Deravin, which appeared in Executive Minute, No. 84/1916, promulgated in *Commonwealth Gazette*, No. 17, of 3rd February, 1916, is cancelled.

Honorary Captain G. H. Skinner is retired under the provisions of Australian Military Regulation 152 (1), 9th July, 1925.

Reserve of Officers.

The name of Captain Ernest Alfred Deravin, which appeared in Executive Minute, No. 182/1911, promulgated in *Commonwealth Gazette*, No. 33, of 29th April, 1911, is amended to read Alfred Ernest Deravin.

Fourth Military District.

Australian Army Medical Corps.

The provisional appointment of Captain N. McLeod is terminated, under the provisions of Section 15 of the *Defence Act*, 9th May, 1925.

To be *Captain (provisionally)*—Norman McLeod, 10th May, 1925.

Australian Army Medical Corps Reserve.

Captain (provisionally) V. R. Delany is transferred from the Australian Army Medical Corps, 3rd Military District, and to be Honorary Captain, 10th February, 1925.

Fifth Military District.

Australian Army Medical Corps.

Colonel D. M. McWhae, C.M.G., C.B.E., is transferred from the Unattached List, 1st May, 1925.

Australian Army Medical Corps Reserve.

Honorary Captain H. T. Kelsall is retired under the provisions of Australian Military Regulation 152 (1), 3rd June, 1925.

Honorary Captains A. E. Stenning and L. G. Male are transferred from the Australian Army Medical Corps Reserve, 3rd Military District, 10th June, 1925.

Honorary Captain J. O'Flynn is transferred from the Australian Army Medical Corps Reserve, 2nd Military District, 1st July, 1925.

Reserve of Officers.

Captain J. E. McGlashan, M.C., is transferred from the Reserve of Officers, 4th Military District, 1st July, 1925.

Sixth Military District.

Australian Army Medical Corps.

Major R. M. W. Webster, M.C., is appointed from the Reserve of Officers, and to be supernumerary to the establishment of Majors, with pay and allowances of Captain, 1st July, 1925.

Captain W. Smellie is transferred to the Australian Army Medical Corps Reserve, 1st July, 1925.

Australian Army Medical Corps Reserve.

Honorary Captains C. H. Martin and N. M. Simpson are transferred from the Australian Army Medical Corps Reserve, 3rd Military District, 1st July, 1925.

Proceedings of the Australian Medical Boards.

VICTORIA.

THE undermentioned has been registered, under the provisions of *The Medical Act, 1915*, as a duly qualified medical practitioner:

Scott, George Ernest Mueller, L.R.C.P. *et* S., L.R.F.P.S., 1925 (Glasgow), 16, Bancroft Street, Bendigo.

Additional Diploma Registered.

Macdonald, Colin Ferguson, Dip. M.R. *et* E., 1925 (Cambridge).

Medical Research.

THE COUNCIL OF THE UNIVERSITY OF MELBOURNE, acting on the advice of a committee appointed for the purpose (see *THE MEDICAL JOURNAL OF AUSTRALIA*, June 6, 1925, page 611), has appointed Dr. R. Marshall Allan, M.C., of Brisbane, the first Director of Obstetrical Research. We congratulate Dr. Allan on this important appointment.

Books Received.

A PRELIMINARY REPORT ON THE TREATMENT OF INTERSTITIAL KERATITIS, by R. Lindsay Rea, M.D., F.R.C.S.; 1925. London: H. K. Lewis & Company, Limited. Demy 8vo., pp. 32, with four coloured plates. Price: 2s. 6d. net.

ALCOHOL IN MEDICAL PRACTICE WITH A CHAPTER ON THE EVOLUTION OF MEDICAL OPINION, by Courtenay C. Weeks, M.R.C.S., L.R.C.P.; 1925. London: H. K. Lewis & Company, Limited. Crown 8vo., pp. 196. Price: 3s. 6d. net.

DYSPEPSIA, ITS VARIETIES AND TREATMENT, by W. Soltan Fenwick, M.D., B.S. (London); Second Edition, Revised. 1925. Philadelphia and London: W. B. Saunders Company; Melbourne: James Little. Royal 8vo., pp. 515, with illustrations. Price: 30s. net.

Medical Appointments.

Dr. Henry Croker Garde (B.M.A.) has been appointed Government Medical Officer at Maryborough, Queensland.

Dr. W. A. T. Lind (B.M.A.) has been appointed Neurologist to the Lunacy Department of Victoria and also Pathologist to the Hospitals for the Insane situated within twenty miles of the General Post Office, Melbourne.

Dr. W. T. Nelson (B.M.A.), Dr. Bryant Oswald Bladen (B.M.A.) and Dr. Osburn Bracewell Goyon (B.M.A.) have been appointed Government Medical Officers for the purposes of *The Miners' Phthisis Act, 1922*, Western Australia.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xviii.

MARRICKVILLE DISTRICT HOSPITAL, SYDNEY: Resident Medical Officer.

MOUNT MULLIGAN DISTRICT HOSPITAL, NORTH QUEENSLAND: Medical Officer.

ROYAL NORTH SHORE HOSPITAL OF SYDNEY: Resident Pathologist.

VICTORIAN EYE AND EAR HOSPITAL, MELBOURNE: Honorary Assistant Aural Surgeon.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C..

BRANCH.	APPOINTMENTS.
	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmalm United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellow's Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phoenix Mutual Provident Society.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIAN: Honorary Secretary, 12, North Terrace, Adelaide.	Contract Practice Appointments at Renmark. Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

- OCT. 1.—Victorian Branch, B.M.A.: Branch, Election of Representatives of Divisions.
OCT. 1.—Section of Orthopaedics, New South Wales Branch, B.M.A.
OCT. 2.—Queensland Branch, B.M.A.: Council.
OCT. 2.—New South Wales Branch, B.M.A.: Delegates of Local Associations meet Council (First Day).
OCT. 3.—New South Wales Branch, B.M.A.: Delegates of Local Associations meet Council (Second Day).
OCT. 6.—New South Wales Branch, B.M.A.: Council (Ordinary).
OCT. 6.—Tasmanian Branch, B.M.A.: Council.
OCT. 8.—South Australian Branch, B.M.A.: Council.
OCT. 8.—New South Wales Branch, B.M.A.: Clinical Meeting.
OCT. 9.—Victorian Branch, B.M.A.: Council.
OCT. 9.—Queensland Branch, B.M.A.: Council.
OCT. 9.—Western Australian Branch, B.M.A.: Council.
OCT. 13.—Tasmanian Branch, B.M.A.: Branch.
OCT. 13.—New South Wales Branch, B.M.A.: Ethics Committee.
OCT. 15.—Section of Neurology and Psychiatry, New South Wales.
OCT. 19.—New South Wales Branch, B.M.A.: Organization and Science Committee.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to *THE MEDICAL JOURNAL OF AUSTRALIA* alone, unless the contrary be stated.

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